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TABLES FOR COMPUTING THE EQUILIBRIUM
CONFIGURATION OF A FLEXIBLE CABLE IN
A UNIFORM STREAM

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RESEARCH AND DEVELOPMENT REPORT

TABLES FOR COMPUTING THE EQUILIBRIUM
CONFIGURATION OF A FLEXIBLE CABLE IN
A UNIFORM STREAM

by

Leonard Pode

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NOTATION

x, y	The rectangular coordinates of an arbitrarily chosen point on the cable; see Figure 1 on page 4.
s	The distance along the cable measured positively in the sense of positive progression along the cable; see Figure 1.
ϕ	The angle from the direction of motion to the direction of the tangent to the cable at an arbitrarily chosen point on the cable, the direction of the tangent being taken in the sense of increasing s; see Figure 1.
ϕ'	The difference $\pi - \phi$
ϕ''	The difference $\phi - \pi$
ϕ_0	The value of ϕ at the point chosen as the origin of the coordinate system
ϕ_c	The critical angle of the cable, i.e , the value of the angle ϕ obtained when the cable is freely trailed in the stream
F	The drag per unit length of the cable when the cable is parallel to the stream·
R	The drag per unit length of the cable when the cable is normal to the stream
R'	The form drag per unit length of the cable when the cable is normal to the stream; $R' = R - F$
T	The tension in the cable at an arbitrarily chosen point
T_0	The tension in the cable at the point chosen as origin of the coordinate system
W	The weight in water per unit length of the cable
τ	The nondimensional tension, T/T_0
ξ, η	The nondimensional rectangular coordinates; $\xi = \dfrac{Rx}{T_0}$; $\eta = \dfrac{Ry}{T_0}$
σ	The nondimensional length of cable, Rs/T_0
f	The ratio F/R
f'	The ratio F/R'
w	The ratio W/R
P	The component of the external forces acting upon an element of cable in the direction of the element
p	The ratio P/R
Q	The component of the external forces, acting upon an element of cable, that is in the direction 90° counterclockwise from the direction of the element
q	The ratio Q/R

TABLES FOR COMPUTING THE EQUILIBRIUM CONFIGURATION
OF A FLEXIBLE CABLE IN A UNIFORM STREAM

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ABSTRACT

The general problem of the equilibrium configuration of a flexible cable immersed in a uniform steady stream is treated analytically. It is shown that, when the configuration of the cable lies entirely in a plane, the solution of the differential equations that describe the configuration can be expressed in terms of certain functions which are called the cable functions and are expressed in terms of quadratures. The specific functions that apply to the most general types of configurations assumed by round cables, when neither the weight of the cable nor the tangential drag of the cable can be neglected, are derived and tabulated. The tabulated values of these functions greatly facilitate the determination of the shape and tension of towing or anchoring cables for a large variety of practical problems both in air and water.

INTRODUCTION

The purpose of these tables is to facilitate the determination of the configuration and tensions of a flexible cable moving in a fluid when neither the frictional drag nor the weight of the cable can be neglected. The first part of this report presents a general discussion of cable configurations. This is followed by the derivation of the specific functions which have been tabulated. The appendices of the report describe the numerical methods used in constructing the tables.

The cable functions describe equilibrium configurations assumed by a flexible cable in a parallel, uniform, steady stream when constant forces are applied to the ends of the cable and the entire cable lies in a plane. Such configurations have been studied in previous papers, References 1 through 14.* The problem is treated here in greater generality, both in regard to the forces involved and the types of configurations considered.

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*References are listed on page 30.

BASIC CONSIDERATIONS

The forces that act on an element of cable are threefold in origin:

1. The hydrodynamic force that arises from the flow.

2. The weight of the element of cable in water.

3. The tensions in the cable at the ends of the element.

The component of the external force (the resultant of the hydrodynamic and gravitational forces) that is tangent to the element acts to increase the tension in the cable. Since the cable is flexible the element bends in a manner that results in the balancing of the normal component of the external forces. The shape of the cable configuration and the tensions in the cable may be determined if the external force acting at each element and the tension and direction of the cable at one reference point are known.

The basic assumption in analyzing the configuration of the cable is that the hydrodynamic force that acts on an element of the cable depends only on the angle that the element makes with the stream and is not affected by such matters as the curvature of the cable or the flow at neighboring elements. In other words the specific hydrodynamic force that acts on an infinitely long cylinder is applicable to a small element of cable of the same size and shape and inclined at the same angle to the stream. From this basic assumption immediately follow two important characteristics of the solution of the cable problem. First, as a consequence of this assumption it follows that any section of a known cable configuration is also the solution of a cable problem. Second, consideration of dimensionality also multiplies the information inherent in a single solution. For example, let the dimensions of a known configuration be altered by some scale factor. Then, in most cases, it may be assumed that the hydrodynamic force acting on any element is simply multiplied by the square of this factor and, if the weight of the cable in water and the forces at the ends of the cable are altered in the same manner, the equilibrium of forces is not disturbed. Therefore the shape of the cable is affected only by multiplication by a scale factor.

By finding a cable configuration of most general shape, i.e., covering the widest range of the angle of the cable to the stream and reducing the solution to a nondimensional form, a solution can be obtained which will be applicable to all problems involving the same nondimensional parameters.

RESTRICTION TO PLANE CONFIGURATIONS

All comments up to this point apply when the shape of the cable is
either a skew or a plane curve. Also, from the basic assumption that the hy-
drodynamic force acting upon an element of cable depends only upon the angle
between the element of the cable and the stream, it can be demonstrated for
both types of configurations that the problem of determining the shape and
tensions of the cable can always be reduced to quadratures whatever the law
relating the hydrodynamic force to the angle of the cable may be. However,
for the present, consideration will be given only to the case of the plane
curve. Therefore the restrictions that must be imposed in order to insure
that the entire cable will lie in a plane will be discussed.

Because the cable is required to bend in a plane, the external force
acting upon any element of cable must lie in the plane of the cable. Converse-
ly, if the external forces on each element of cable and the forces applied to
the ends of the cable lie in a plane, the entire cable will lie in the plane
of the forces. However, when the hydrodynamic force has a component that is
normal to both the direction of motion and the direction of the element of
cable, the entire cable will lie in a plane only in unusual cases. Therefore,
for the present analysis, it will be required that the hydrodynamic force act
in the plane including the direction of motion and the direction of the ele-
ment of cable. Whenever the cable presents a symmetrical profile to the flow
this requirement is fulfilled. Thus a smooth round cable fulfills the require-
ment but a stranded cable does so only approximately. Fulfillment of this re-
quirement is sufficient to ascertain that the cable will lie entirely in a
plane when the weight of the cable is negligible. The plane of the cable will
be the plane that includes the direction of motion and the direction of the
force applied to one end of the cable. (The force applied at the opposite end
of the cable must also lie in this plane in order to obtain an equilibrium
configuration.) When the weight of the cable is not negligible the cable must
lie in the plane including the direction of gravity and the direction of mo-
tion, and the forces applied to the end of the cable must also lie in this
plane.

GENERAL INTEGRATION OF THE DIFFERENTIAL EQUATIONS

THE DIFFERENTIAL EQUATIONS

If both the direction of gravity and the la' relating the hydro-
dynamic force to the angle between an element of cable and the stream are spec-
ified, the external force acting upon an element of cable is a known function
of this angle. Then the components of the force parallel to the element of

the cable and normal to the element of the cable may both be written as explicit functions of this angle.

Choose a sense of progression along the cable and let ϕ be the angle measured counterclockwise from the direction of motion to the direction of an element of the cable of length, ds. Let $P(\phi)$ds and $Q(\phi)$ds be the tangential and normal components of the external force respectively (where $P(\phi)$ is measured positive in the direction of the element of cable which is taken in the sense of increasing length of cable, s, in accordance with the chosen sense of progression, and $Q(\phi)$ is measured positive in the direction of the positive normal which is taken in the direction 90° counterclockwise from the direction of the element of the cable). Then the equilibrium of the cable element requires

$$dT = -P(\phi)ds \tag{1}$$

$$Td\phi = -Q(\phi)ds \tag{2}$$

where T is the tension in the cable and dT and dϕ are the changes in the values of T and ϕ over the length of the element; see Figure 1. Since the forces that act on an element of the cable cannot be affected by the choice of the
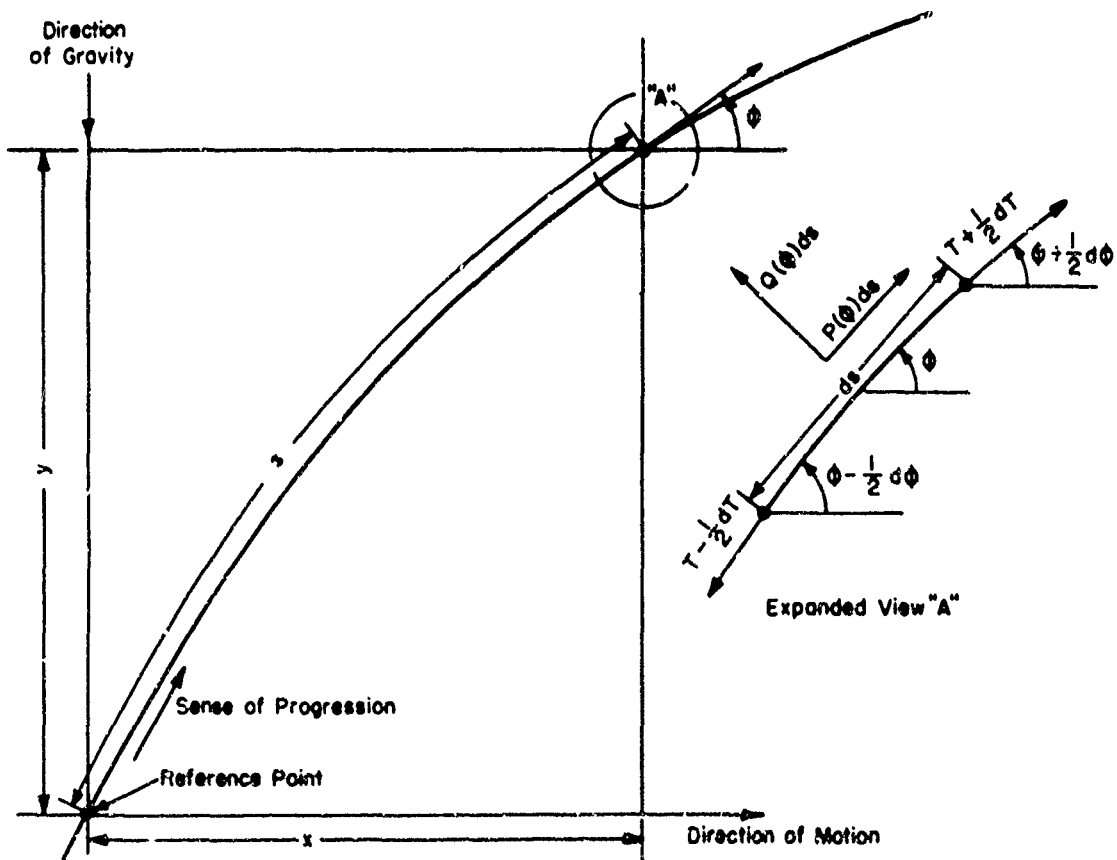
Figure 1 - Coordinate System

sense of progression along the cable the functions $P(\phi)$ and $Q(\phi)$ must satisfy the relations: $P(\phi) = -P(\phi + \pi)$, $Q(\phi) = -Q(\phi + \pi)$.

THE CRITICAL ANGLE

Special interest attaches to the values of the angle $\phi = \phi_c$ which are roots of the equation $Q(\phi_c) = 0$. When the cable is towed by itself, i.e., the cable is simply trailed without a towed body at the end of the cable, the configuration of the cable could be any straight line inclined to the stream at such an angle $\phi = \phi_c$. In order that there be a completely unique solution for this condition it is required that the equation $Q(\phi_c) = 0$ have no more than one root in the range $0 \leq \phi \leq \pi$. Unless this root is of at least order one, Equation [2] would be integrable through all values of ϕ and the most general shape of the cable then would be a spiral of an unlimited number of turns. Such a configuration is in disagreement with observation and would be incongruous in the situation being considered. It is therefore assumed that in general the equation $Q(\phi_c) = 0$ will have only one root and this root will be of order one or greater. This angle will be called the critical angle.

On the basis of the above assumptions regarding the critical angle the following statements can be readily verified:

1. If the angle of the cable is equal to the critical angle anywhere, the angle of the cable is everywhere equal to the critical angle.

2. If the angle of the cable is anywhere different from the critical angle, the angle of the cable is nowhere equal to the critical angle for any finite length of cable.

3. By a suitable choice of the positive sense of progression along the cable the maximum range of the angle of the cable may be restricted to $\phi_c < \phi < \phi_c + \pi$ and in this range the value of Q is always of the same sign so that the curvature of the cable, $d\phi/ds$, is everywhere of the same sign.

4. The angle of the cable approaches the critical angle as the length of the cable is indefinitely increased.

5. When the cable is towed by itself the configuration of the cable is a straight line inclined to the stream at the critical angle.

GENERAL INTEGRATION FROM AN ARBITRARY REFERENCE POINT

The general integration of Equations [1] and [2] may now proceed. Eliminating ds from Equations [1] and [2]

$$\frac{dT}{T} = \frac{P(\phi)}{Q(\phi)} \, d\phi \tag{3}$$

Now assume that at some point, P_0, on the cable, the tension in the cable T_0 and the angle from the direction of motion ϕ_0 are known. Equation [3] may be integrated from this reference point P_0 along the cable to any arbitrary point P on the cable where the tension is T and the angle is ϕ; thus

$$\frac{T}{T_0} = e^{\int_{\phi_0}^{\phi} \frac{P(\phi)}{Q(\phi)} d\phi} \qquad [4]$$

Using this result in Equation [2]

$$ds = \frac{T_0}{-Q(\phi)} e^{\int_{\phi_0}^{\phi} \frac{P(\phi)}{Q(\phi)} d\phi} \qquad [5]$$

so that the distance along the cable from P_0 to P is given by

$$s = \int_{\phi_0}^{\phi} \frac{T_0}{-Q(\phi)} e^{\int_{\phi_0}^{\phi} \frac{P(\phi)}{Q(\phi)} d\phi} d\phi \qquad [6]$$

The location of the point P in relation to the point P_0 may be found in terms of coordinates x and y, representing a displacement parallel to the direction of motion and displacement perpendicular to the direction of motion respectively. From the geometry, dx = (cos ϕ)ds and dy = (sin ϕ)ds; hence

$$x = \int_{\phi_0}^{\phi} \frac{T_0}{-Q(\phi)} e^{\int_{\phi_0}^{\phi} \frac{P(\phi)}{Q(\phi)} d\phi} \cos\phi \, d\phi \qquad [7]$$

$$y = \int_{\phi_0}^{\phi} \frac{T_0}{-Q(\phi)} e^{\int_{\phi_0}^{\phi} \frac{P(\phi)}{Q(\phi)} d\phi} \sin\phi \, d\phi \qquad [8]$$

The question of expressing these results nondimensionally now arises. The tension T is already in nondimensional form in terms of the known tension T_0. For the distances s, x and y, a characteristic unit of length is needed. In general the most convenient unit of length is that length of cable which when entirely normal to the stream has a drag equal to the tension T_0, i.e., T_0/R where R is the drag per unit length when the cable is normal to the stream. Dividing the distances s, x and y by this length the nondimensional values $\sigma = Rs/T_0$; $\xi = Rx/T_0$; $\eta = Ry/T_0$ are obtained. Then letting $p = P(\phi)/R$; $q = Q(\phi)/R$ and using equations [4], [6], [7], and [8], the solution of the cable problem may be written

$$\tau = \frac{T}{T_0} = e^{\int_{\phi_0}^{\phi} \frac{p}{q} d\phi}$$ [9a]

$$\sigma = \frac{Rs}{T_0} = \int_{\phi_0}^{\phi} \frac{\tau}{-q} d\phi$$ [9b]

$$\xi = \frac{Rx}{T_0} = \int_{\phi_0}^{\phi} \frac{\tau \cos \phi}{-q} d\phi$$ [9c]

$$\eta = \frac{Ry}{T_0} = \int_{\phi_0}^{\phi} \frac{\tau \sin \phi}{-q} d\phi$$ [9d]

where only nondimensional values are involved and all functions are defined by quadratures.

SHIFTING OF REFERENCE POINT

If it is desired to change the reference point from P_0 to some other point P_1 on the cable where the tension in the cable is T_1 and the angle of the cable is ϕ_1, it is only necessary to replace the 0 subscript in the above equations with the subscript 1 and interpret s_1, x_1, and y_1 as distance along the cable and displacements from the point P_1. The new functions τ', σ', ξ', η' obtained with P_1 as reference point are related to the functions τ, σ, ξ, η obtained with P_0 as reference point by the equations.

$$\tau' = \frac{T}{T_1} = \frac{\tau}{\tau_1}$$ [10a]

$$\sigma' = \frac{Rs_1}{T_1} = \frac{\sigma - \sigma_1}{\tau_1}$$ [10b]

$$\xi' = \frac{Rx_1}{T_1} = \frac{\xi - \xi_1}{\tau_1}$$ [10c]

$$\eta' = \frac{Ry_1}{T_1} = \frac{\eta - \eta_1}{\tau_1}$$ [10d]

where τ_1, σ_1, ξ_1, η_1 are respectively the values of the functions τ, σ, ξ, η, for $\phi = \phi_1$. By these equations the shape and tensions in the cable can be determined if the location, tension and angle are known at any point and a

table of the functions τ, σ, ξ, η, based on any reference point is available. This statement is true even if the reference point P_0 for the table is hypothetical and does not actually exist in the particular configuration to which the use of the tables is applied.

The set of functions τ, σ, ξ, η, defined by Equations [9a,b,c,d] is referred to as the cable functions. Consideration will now be given to the particular forms assumed by these functions when specific assumptions are made regarding the forces that act upon the cable.

SPECIFIC SOLUTIONS FOR THE CABLE FUNCTIONS

SOLUTIONS NEGLECTING GRAVITY AND THE TANGENTIAL COMPONENT

The simplest situation arises when both the tangential component of the hydrodynamic force and the gravity forces are negligible. The gravity forces may be neglected either when the cable is in fact neutrally buoyant or when the speed of the stream is such that the gravity forces are insignificant in comparison to the hydrodynamic forces. Except when the cable is inclined at very small angles to the stream the tangential component of the hydrodynamic force acting on round or stranded cables is found to be considerably smaller than the normal component. Therefore, when the cable is so short that the change in tension over the length of the cable is small in relation to the forces at the ends of the cable, and when the inclination of the cable to the stream is reasonably large over most of the length of the cable, it is permissible to neglect the tangential component of the hydrodynamic force.

That the normal component of the hydrodynamic force varies with the square of the sine of the angle between the cable and the stream is well established by experimental evidence and supported by theoretical considerations.[2,8,12] Neglecting the gravity forces and the tangential component of the hydrodynamic force and using this variation of the normal component, the forces acting upon an element of cable are as represented in Figure 2a. The tangential component of the force is always zero, i.e., $P(\phi) = 0$ and when the positive sense of progression along the cable is taken in the clockwise direction, the normal component is given by $Q(\phi) = +R \sin \phi |\sin \phi|$ where the sign has been arranged to take into account the fact that the normal component will never have a positive projection in the direction of the motion. The critical angle is obviously zero so that the range of the angle ϕ may be taken as $0 < \phi < \pi$. Hence $\sin \phi$ will always be positive and the normal component may be represented by $Q(\phi) = +R \sin^2 \phi$. If the point where the cable is normal to the stream is chosen as the reference point and coordinates are chosen as indicated in Figure 1 the cable functions become:

$$\tau = 1 \qquad\qquad [11a]$$

$$\sigma = \cot \phi \qquad\qquad [11b]$$

$$\xi = \csc \phi - 1 \qquad\qquad [11c]$$

$$\eta = \ln \cot \frac{\phi}{2} \qquad\qquad [11d]$$
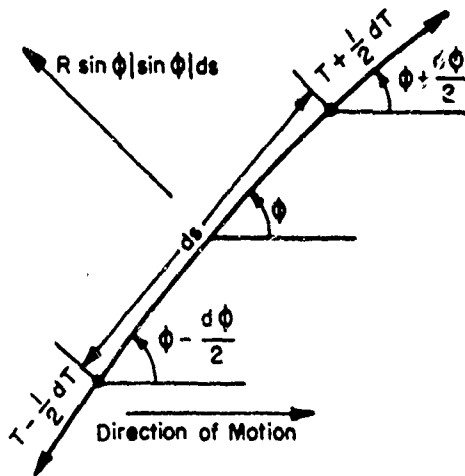
Figure 2a

Assuming sine-squared law for the normal component of the hydrodynamic force and neglecting the tangential component and the weight of the cable.
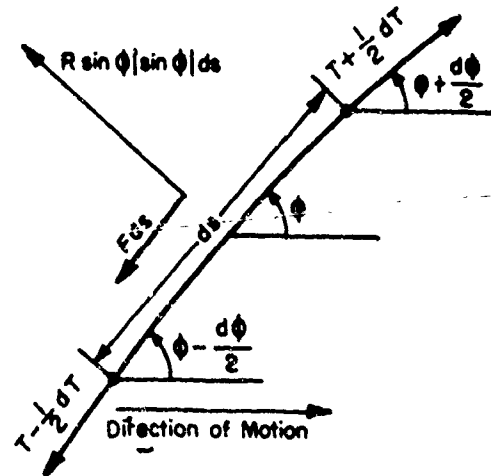
Figure 2b

Assuming a sine-squared law for the normal component of the hydrodynamic force and a constant tangential component and neglecting the weight of the cable.
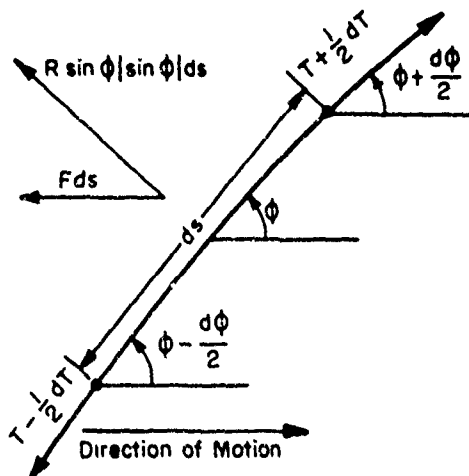
Figure 2c

Assuming a constant frictional drag in the direction of the stream in addition to a sine-squared law for the form drag normal to the cable and neglecting the weight of the cable.
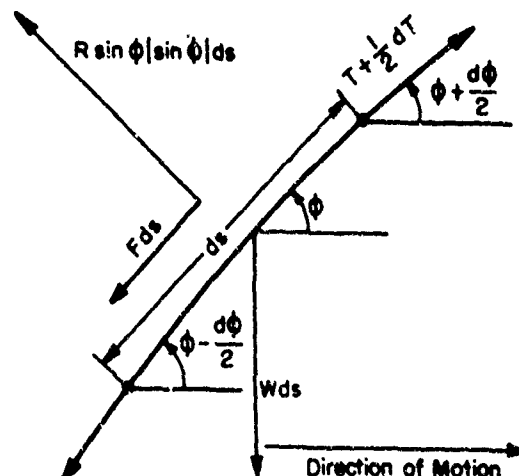
Figure 2d

Assuming a sine-squared law for the normal component of the hydrodynamic force and a constant tangential component and not neglecting the weight of the cable.

Figure 2 - Forces Acting on an Element of Cable

The shape of the cable may be identified as that of a catenary. Eliminating the parameter ϕ between η and ξ one obtains $\xi = \cosh \eta - 1$. It is apparent that the general shape of the cable is symmetrical about a line parallel to the direction of the stream and that the tension is constant throughout the cable. It is also noteworthy that R acts only as a scale factor and does not enter directly in these functions. Therefore, the functions do not change when the speed of the stream varies.

SOLUTION NEGLECTING ONLY GRAVITY

The most serious limitation to the solution given in Equations [11a, b,c,d] is that in many applications the cable will be too long to permit the neglect of the effect of the tangential component of the hydrodynamic force in producing an increase in tension over the length of the cable. Few data are to be had regarding the relation of the tangential component of the hydrodynamic force to the angle between the cable and the stream. This component has been alternately assumed as constant and as varying with the cosine of the angle. When it is assumed that the tangential component is constant (see Figure 2b), all the cable functions are not integrable but ξ and η must be evaluated by numerical integration. This calculation is given by Landweber and Protter[4] for the case when the ratio F/R of the tangential component per unit length to the drag of the cable per unit length when normal to the stream, has the value 0.022. There is, however, a modification, due to Reber[1] of the assumptions regarding the hydrodynamic force under which all the cable functions are explicitly integrable in terms of tabulated functions. Here the hydrodynamic force that acts upon an element of cable is described as consisting of two parts, namely:

1. A profile drag, $R' \sin\phi |\sin\phi|$, per unit length of cable that acts normal to the cable and varies as the square of the sine of the angle that the element makes with the stream.

2. A frictional drag that acts in line with the stream and has a magnitude F per unit length of cable that is independent of the angle that the element makes with the stream.

The forces acting upon an element of cable are then as represented in Figure 2c. Choosing the clockwise sense as the positive sense of progression along the cable $P(\phi) = -F \cos\phi$ and $Q(\phi) = +R' \sin\phi |\sin\phi| + F \sin\phi$. Again the critical angle is zero and the range of ϕ may be restricted to $0 < \phi < \pi$ so that $\sin\phi$ is always positive and $Q(\phi)$ may be written $Q(\phi) = +R' \sin^2\phi + F \sin\phi$. It is apparent that when F is small and ϕ is large enough so that $\sin\phi$ is not very much less than one, the normal component of the hydrodynamic

force has been only slightly changed and the profile drag per unit length of the cable when the cable is normal to the stream, which is given by $R = R' + F$, differs very little from R'.

If the point at which the cable is normal to the stream is chosen as reference point, and coordinates chosen as indicated in Figure 1, then the cable functions integrate to

$$\tau = \frac{1 + f' \csc \phi}{1 + f'} \qquad [12a]$$

$$\sigma = \cot \phi \qquad [12b]$$

$$\xi = \csc \phi - 1 \qquad [12c]$$

$$\eta = \ln \cot \frac{\phi}{2} \qquad [12d]$$

where $f' = F/R'$. Also, by eliminating ϕ between Equation [12a] and Equation [12c] or by direct integration of Equation [1] the additional relationship is obtained

$$\tau = 1 + f \xi \qquad [12e]$$

where $f = F/R$. In dimensional form this equation may be written

$$T = T_0 + Fx \qquad [12f]$$

It is seen that the shape of the cable is still that of a catenary, the functions σ, ξ, and η having been unaffected. The only function that has been changed is τ which is also the only function that explicitly involves the parameters F and R'. Because, in general, the ratio $f' = F/R'$ will not change with the speed of the stream, all of the cable functions are again independent of the speed. The cable configuration is again symmetrical about a line parallel to the direction of motion.

SOLUTION NEGLECTING NEITHER GRAVITY NOR THE TANGENTIAL COMPONENT

The present analysis of the cable configuration applies regardless of the density of the fluid in which the cable is moving. When the cable is moving in air the situation might readily arise where the tangential component of the aerodynamic force is negligible but the weight of the cable is not. A treatment of this case for some types of cable configurations is given by Glauert.[2] When the cable is moving at sufficiently low speed in water such a relation of forces may also be obtained but in water this case is less frequent. Furthermore, if the weight of the cable is not neglected, the cable

functions (with the exception of τ) are not integrable in terms of tabulated functions, whether the tangential component is or is not neglected, and numerical integrations are necessary. Therefore, whenever the effect of gravitational forces must be considered it is just as well to include in addition the effect of the tangential component of the hydrodynamic force.

It is clear that the gravity forces cannot be ignored when the speed of the stream is sufficiently low so that these forces are not small in comparison to the hydrodynamic force, but even at higher speeds the effect of the weight of the cable may have an important influence upon the shape assumed by the cable. It has been demonstrated that when the weight of the cable is ignored the critical angle is zero. Presently it will be shown that the critical angle is a function of the ratio W/R where W is the weight per unit length of the cable in water and R is, as before, the drag per unit length of the cable when the cable is normal to the stream. When the length of cable is such that a large part of the cable is at an angle close to the critical angle even a relatively small error in the critical angle may introduce a serious error in calculating the depth of the cable. Moreover, certain types of configurations can be realized only by considering the effect of the weight of the cable. For example, the sag in a cable used to tow a float from a surface vessel cannot be found when the effect of the weight of the cable is ignored. Thus situations also arise where neither the inertial forces nor the tangential component of the hydrodynamic force can be ignored.

If, for simplicity, the magnitude of the tangential component of the hydrodynamic force per unit length F is assumed to be constant and the direction of motion is perpendicular to the direction of gravity the forces to be considered acting on an element of cable are as represented in Figure 2d. Again taking progression along the cable as positive in the clockwise sense,

$$P(\phi) = -F \frac{\cos \phi}{|\cos \phi|} - W \sin \phi \qquad [13]$$

$$Q(\phi) = +R \sin \phi \,|\sin \phi| - W \cos \phi \qquad [14]$$

where W is the weight in water per unit length of the cable. The sign of $F \cos \phi/|\cos\phi|$ is proper in order to take into account the fact that the tangential component as well as the normal component of the hydrodynamic force never has a positive projection in the direction of motion.

The critical angle may be assumed to lie in the range $0 \leq \phi_c < \pi$ so that the equation

$$R \sin^2 \phi_c - W \cos \phi_c = 0 \qquad [15a]$$

is satisfied. Substituting $\sin^2 \phi_c = 1 - \cos^2\phi_c$ and dividing by R

$$\cos^2\phi_c + \frac{W}{R}\cos\phi_c - 1 = 0 \qquad [15b]$$

Hence

$$\cos\phi_c = -\frac{W}{2R} + \sqrt{\left(\frac{W}{2R}\right)^2 + 1} \qquad [15c]$$

when W is positive as in the case of the negatively buoyant cable and

$$\cos\phi_c = -\frac{W}{2R} - \sqrt{\left(\frac{W}{2R}\right)^2 + 1} \qquad [15d]$$

when W is negative as in the rare case of a positively buoyant cable. The sign of W can be reversed simply by reversing the sign of the direction of gravity so that the configuration of a positively buoyant cable can be obtained from the configuration of a negatively buoyant cable by a reflection in the line of the direction of motion. For the negatively buoyant cable W is positive and the critical angle ranges from zero when $W/R = 0$ to $\pi/2$ when W/R is infinite. Negative values of W would give rise to critical angles in the range $\pi/2 \le \phi_c \le \pi$. Since the cable functions for a critical angle in this range can be obtained in a simple manner from the cable functions for the supplementary critical angle, it is only necessary to consider the negatively buoyant cable and the range of critical angles may be restricted to $0 \le \phi_c \le \pi/2$. For a given cable, W is constant but R varies with the speed of the stream. Therefore W/R and ϕ_c vary with speed. Hence the cable functions are no longer independent of the speed of the stream.

The cable functions may be written

$$\ln \tau = \int_{\phi_0}^{\phi} \frac{f\frac{\cos\phi}{\cos\phi} + w\sin\phi}{-\sin\phi\,|\sin\phi| + w\cos\phi}\,d\phi \qquad [16a]$$

$$\sigma = \int_{\phi_0}^{\phi} \frac{\tau}{-\sin\phi\,|\sin\phi| + w\cos\phi}\,d\phi \qquad [16b]$$

$$\xi = \int_{\phi_0}^{\phi} \frac{\tau\cos\phi}{-\sin\phi\,|\sin\phi| + w\cos\phi}\,d\phi \qquad [16c]$$

$$\eta = \int_{\phi_0}^{\phi} \frac{\tau\sin\phi}{-\sin\phi\,|\sin\phi| + w\cos\phi}\,d\phi \qquad [16d]$$

where $f = F/R$ and $w = W/R$. Again by direct integration of Equation [1]

$$\tau = 1 + f \int_{P_0}^{P} \frac{\cos \phi}{|\cos \phi|} d\sigma + w \eta \qquad [16e]$$

If the point where the cable is normal to the stream is chosen as reference point this equation may be written

$$\tau = \tau_0 + f|\sigma| + w \eta \qquad [16f]$$

or in dimensional form

$$T = T_0 + F|s| + Wy \qquad [16g]$$

The best choice of reference point is now not so obvious. In addition to the point where the cable is normal to the stream, i.e., $\phi = \pi/2$, the point where the cable is parallel to the stream, i.e., $\phi = \pi$, is often a useful reference point. For calculating the cable functions it is convenient to divide the integrations into the three quadrants in which the angle ϕ may fall, namely:

Quadrant 1 where $\phi_c < \phi \leq \pi/2$

Quadrant 2 where $\pi/2 \leq \phi \leq \pi$

Quadrant 3 where $\pi \leq \phi < \pi + \phi_c$

For Quadrant 1 the point where $\phi = \pi/2$ is the most convenient reference point but for Quadrant 3 the point where $\phi = \pi$ is most convenient. For Quadrant 2 both reference points are equally convenient. Since cable configurations that extend through Quadrants 2 and 3 are more frequent than those extending through Quadrants 1 and 2, the point where $\phi = \pi$ has been used for the reference point of Quadrant 2. With such choice of reference points the cable functions become:

Quadrant 1 ≡ $\phi_c < \phi \leq \pi/2$ Reference Point $\phi = \pi/2$

$$\ln \tau = \int_{\pi/2}^{\phi} \frac{f + w \sin \phi}{-\sin^2 \phi + w \cos \phi} d\phi \qquad [17a]$$

$$\sigma = \int_{\pi/2}^{\phi} \frac{\tau}{-\sin^2 \phi + w \cos \phi} d\phi \qquad [17b]$$

$$\xi = \int_{\pi/2}^{\phi} \frac{\tau \cos \phi}{-\sin^2 \phi + w \cos \phi} d\phi \qquad [17c]$$

$$\eta = \int_{\pi/2}^{\phi} \frac{\tau \sin \phi}{-\sin^2 \phi + w \cos \phi} d\phi \qquad [17d]$$

$$\tau = 1 + f\sigma + w\eta \qquad [17e]$$

Quadrant 2, $\pi/2 \leq \phi \leq \pi$ Reference Point $\phi = \pi$

$$\ln \tau = \int_{\pi}^{\phi} \frac{-f + w \sin \phi}{-\sin^2 \phi + w \cos \phi} d\phi \qquad [18a]$$

$$\sigma = \int_{\pi}^{\phi} \frac{\tau}{-\sin^2 \phi + w \cos \phi} d\phi \qquad [18b]$$

$$\xi = \int_{\pi}^{\phi} \frac{\tau \cos \phi}{-\sin^2 \phi + w \cos \phi} d\phi \qquad [18c]$$

$$\eta = \int_{\pi}^{\phi} \frac{\tau \sin \phi}{-\sin^2 \phi + w \cos \phi} d\phi \qquad [18d]$$

$$\tau = 1 - f\sigma + w\eta \qquad [18e]$$

Quadrant 3, $\pi \leq \phi < \pi + \phi_c$ Reference Point $\phi = \pi$

$$\ln \tau = \int_{\pi}^{\phi} \frac{-f + w \sin \phi}{+\sin^2 \phi + w \cos \phi} d\phi \qquad [19a]$$

$$\sigma = \int_{\pi}^{\phi} \frac{\tau}{\sin^2 \phi + w \cos \phi} d\phi \qquad [19b]$$

$$\xi = \int_{\pi}^{\phi} \frac{\tau \cos \phi}{\sin^2 \phi + w \cos \phi} d\phi \qquad [19c]$$

$$\eta = \int_{\pi}^{\phi} \frac{\tau \sin \phi}{\sin^2 \phi + w \cos \phi} d\phi \qquad [19d]$$

$$\tau = 1 - f\sigma + w\eta \qquad [19e]$$

These are the functions which are presented in Tables 1, 3, and 2, respectively. In order to obtain a set of functions based on the same reference point that covers all three quadrants, so that those cable configurations that do extend into all three quadrants may be more readily handled, the

functions for Quadrant 1 have been adjusted to the reference point $\phi = \pi$ by means of the relations presented in Equations [10a,b,c,d] and are tabulated in Table 4.
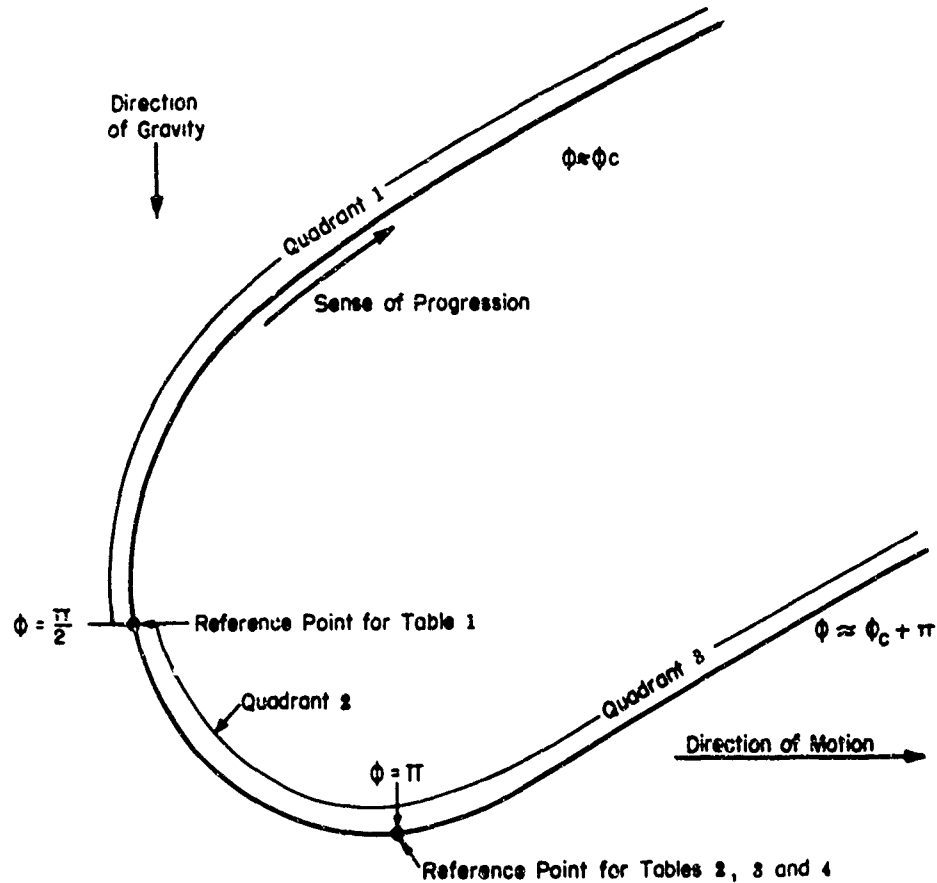
Figure 3 - General Configuration of a Heavy Cable in a Uniform Stream

NUMERICAL EXAMPLES

The following numerical examples have been worked out to illustrate the application of the tables to the solution of cable problems.

EXAMPLE 1. ANCHORING A BUOY

It is desired to anchor a buoy in 3600 feet of water using a 7/16-in. diameter stranded cable. The cable weighs 0.27 lb/ft in water. The drag of the cable when normal to the stream at five knots is 3.9 lb/ft. The buoy has an excess buoyancy of 7300 lb when fully submerged and in this condition in a current of five knots it has dynamic lift of 1800 lb and a drag of 5200 lb. What is the minimum length of cable required to insure that the buoy will never be submerged if the ocean currents are always uniform and less than five knots?

The minimum length of cable required is that with which the buoy would be submerged at the water surface in the extreme condition of a uniform current of five knots. Choose coordinates as shown in Figure 4. The total lift of the body, L, is given as 7300 plus 1800 which equals 9100 pounds. The drag, D, is 5200 pounds. For equilibrium at the point of attachment to the buoy the tension in the cable at this point, T_2, is given by $T_2 = \sqrt{L^2 + D^2} = \sqrt{(9100)^2 + (5200)^2}$ pounds = 10,500 pounds, and the angle of the cable at this point, ϕ_2, is defined by $\tan \phi_2 = \frac{-9100}{5200} = -1.7500$ giving $\phi_2 = 119.75$ degrees. The ratio of the unit weight of the cable W, to the unit drag, R, is given by $\frac{W}{R} = \frac{0.27}{3.9} = 0.0692$. Using this value in Equation [15c] the critical angle ϕ_c is found to be sufficiently close to 15 degrees so that for the purposes of this problem interpolation between critical angles is unnecessary. For the cable being used the value $f = F/R = 0.02$ applies as a sufficiently good approximation. Using Table 3 the values of the cable functions pertaining to the point of attachments are found to be $\tau_2 = 0.9983$; $\sigma_2 = 5.195$, $\eta_2 = 1.474$. If η_1 and τ_1 are the values of η and τ pertaining to the point of contact with the ocean bottom and y is the depth of water, i.e., 3600 feet, we have from Equations [10a] and [10d],

$$\frac{Ry\tau_1}{T_1} = (3.9)(3600)\frac{\tau_1}{T_1} = \eta_2 - \eta_1 = 1.474 - \eta_1 \quad \text{and} \quad \frac{\tau_1}{T_1} = \frac{\tau_2}{T_2}$$
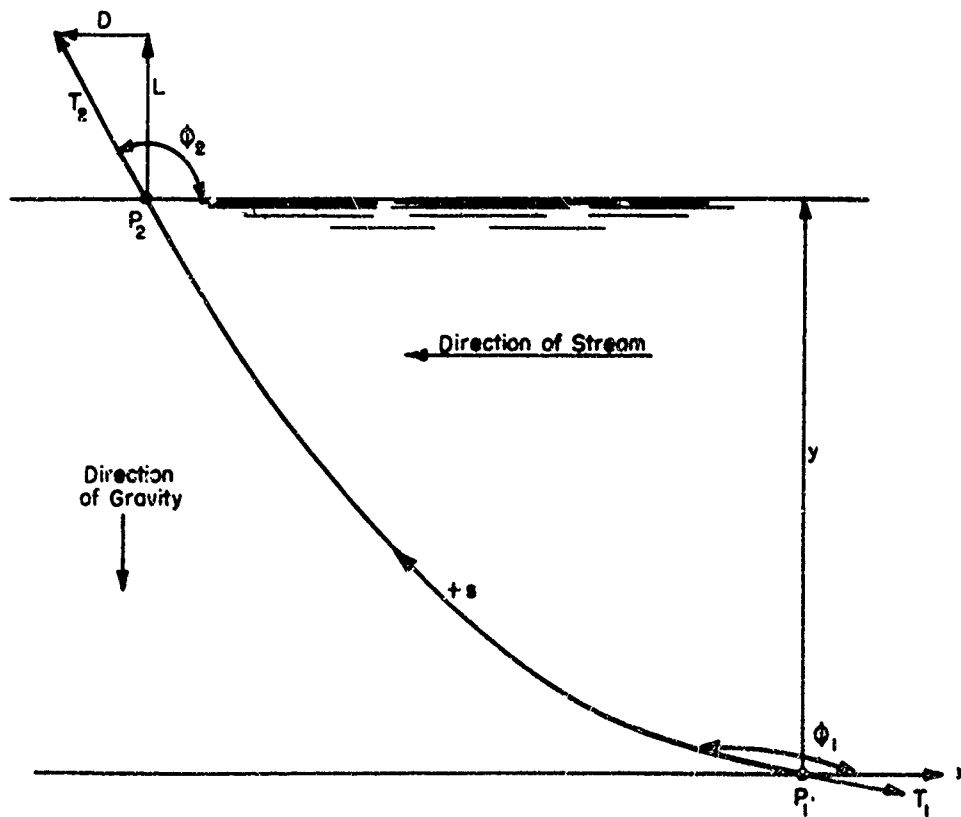
Figure 4 - Cable Configuration for a Moored Buoy

so that

$$\eta_1 = 1.474 - \frac{(3.9)(3600)(0.9983)}{10,500} = 0.139$$

Interpolation in the table then gives $\phi_1 = 171.37°$ and $\sigma_1 = 1.946$ for the value of these functions pertaining to the point of contact with the ocean bottom. The length of the cable can now be determined:

$$s = \frac{T_2}{R} \left(\frac{\sigma_2 - \sigma_1}{\tau_2}\right) = \frac{10,500 \ (5.195 - 1.946)}{3.9 \ x \ 0.9983} \ \text{feet} = 8700 \ \text{feet}$$

EXAMPLE 2. TOWING A DEPRESSOR

It is desired to tow a depressor that at operating speed applies a force at its towpoint of 136,000 pounds at an angle of 70° from the direction of the stream. The depressor is to be towed from a cable that weighs ten pounds per foot in water and has a drag of 365 pounds per foot when normal to the stream at operating speed The ratio of the tangential drag to the normal drag of the cable is known to be 0.022. If a length of 2550 feet of cable is used what is the depth of the depressor and the tension at the upper end of the cable?

Choose coordinates as shown in Figure 5. The critical angle is computed, using Equation [15c]. Thus $\cos \phi_c = 0.9865$; $\phi_c = 9.43°$. Since the functions for this critical angle are not tabulated the problem will be solved
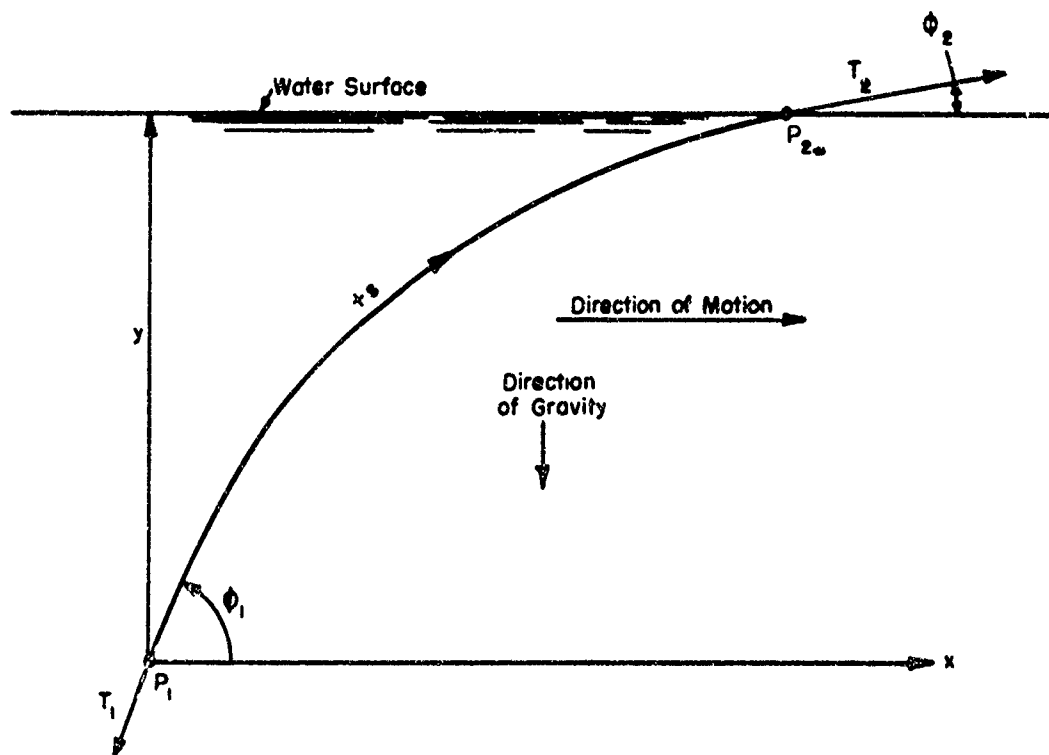
Figure 5 - Cable Configuration for Towing of a Depressor

using the functions for $\phi_c = 5°$ and $\phi_c = 10°$ and the results for $\phi_c = 9.43°$ will be found by interpolation. For the point at the depressor, P_1, $\phi_1 = 70°$, and the values $\tau = 1.0108$, $\sigma_1 = 0.3664$ and $\eta_1 = 0.3588$ are found by interpolation for $f = 0.022$ in Table 1, using the functions for $\phi_c = 5°$. Then the value of σ_2 for P_2, the point at the upper end of the cable, is

$$\sigma_2 = \frac{Rs\tau_1}{T_1} + \sigma_1 = \frac{(365)(2550)(1.0108)}{136,000} + 0.3664 \approx 7.2840$$

Now by inverse-interpolation in Table 1, the angle ϕ_2 is found to be $\phi_2 = 9.52°$ and $\eta_2 = 2.8145$ and $\tau_2 = 1.1821$; so that the depth $y = \frac{T_1}{R} \frac{(\eta_2 - \eta_1)}{\tau_1} = 905$ feet and the tension at the upper end

$$T_2 = \frac{\tau_2}{\tau_1} T_1 = \frac{1.1821}{1.0108} \times 136,000 \text{ pounds} = 159,000 \text{ pounds}$$

Following the same procedure but using the functions for $\phi_c = 10°$ we find the depth $y = 976$ feet and the tension $T_2 = 167,000$ pounds. Interpolating for $\phi_c = 9.43°$ between these values gives $y = 968$ feet and $T_2 = 166,000$ pounds.

EXAMPLE 3. TOWING A SURFACE TARGET

A surface target is towed at a speed of ten knots with a 1 3/8-in. cable. The weight of the cable in water is 3.57 pounds per foot. The general float problem requires a knowledge of the variation of the drag with the displacement of the float and is solved by a method of successive approximations as explained in Reference 5. For the purpose of illustrating the use of the tables the problem will be considerably simplified by assuming that the drag of the target is known to be 20,000 pounds and the cable at the target is known to enter the water at an angle of 40° to the direction of motion. The problem is to locate the lowest point of the cable.

Choose coordinates as shown in Figure 6. Assume

$$\frac{F}{R} = 0.02 \text{ and } R = 1.6 \frac{\rho V^2 d}{2} = (1.6)(2.853)(100)\frac{(1.375)}{12} \text{ lb/ft} = 52.3 \text{ lb/ft}$$

The critical angle calculated by Equation [15c] is sufficiently close to 15° so that interpolation is not necessary. The angle ϕ_3 is given as 140°. Hence the tension in the cable at the point of attachment to the target, P_3, is $T_3 = -D \sec \phi_3 = (20,000)(1.305)$ lb = 26,100 lb. Using Table 3 the values of the cable functions pertaining to P_3 are found to be:

$$\sigma_3 = +4.629; \quad \eta_3 = 1.047; \quad \tau_3 = 0.9800; \quad \xi_3 = -4.432$$
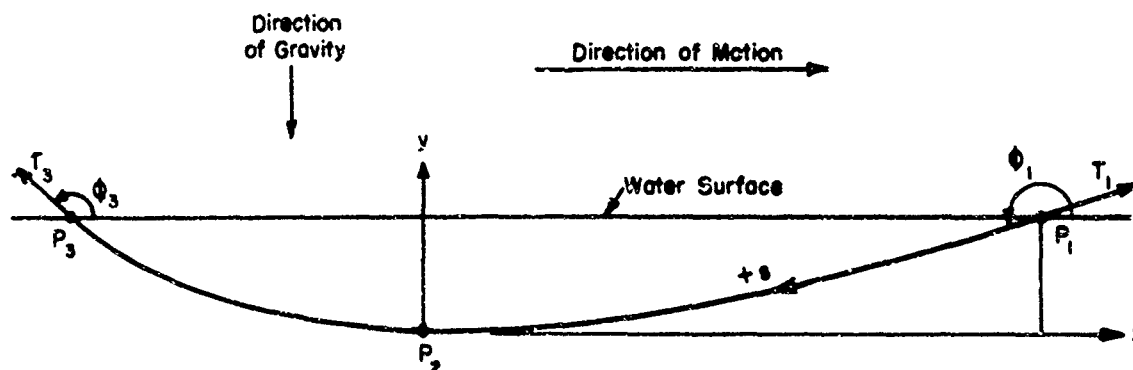
Figure 6 - Configuration of a Cable Towing a Surface Target

Since the point of attachment to the towing vessel, P_1, is in a horizontal plane with P_3; $\eta_1 = \eta_3 = 1.047$. Interpolating in Table 2 it is found:

$$\phi_1 = 193.75°; \quad \sigma_1 = -6.626; \quad \xi_1 = 6.526; \quad \tau_1 = 1.205$$

The tension at the towing vessel is $T_1 = \dfrac{\tau_1}{\tau_3} T_3 = 32,100$ pounds, and the distance from P_1 to P_3 is $\dfrac{T_1}{R} \dfrac{(\xi_1-\xi_3)}{\tau_1} = 5580$ feet. At P_2 the cable has zero slope, i.e., $\phi_2 = 180°$ and the values of the cable functions are: $\tau_2 = 1.000$; $\sigma_2 = \eta_2 = \xi_2 = 0$. The horizontal distance from P_1 to P_2 is thus $\dfrac{T_1}{R} \dfrac{(\xi_1-\xi_2)}{\tau_1} = 3320$ feet and the depth at P_2 is $\dfrac{T_1}{R} \dfrac{(\eta_1-\eta_2)}{\tau_1} = 533$ feet. The length of the cable is $\dfrac{T_1}{R} \dfrac{(\sigma_3-\sigma_1)}{\tau_1} = 5730$ feet.

EXAMPLE 4. CONFIGURATION OF A STRING IN THE WIND

A string that is 34 in. long is immersed in a uniform horizontal wind with its ends fastened to two points that are one foot apart vertically. When trailed in the wind it has been found that the critical angle is 30°. Assuming $F/R = 0.025$, what will be the angles of the string at the points of attachment and locate the lowest point on the string and the point fartnest downwind.

Choose coordinates as shown in Figure 7. The lower point of attachment is P_1, and upper P_4. The lowest point of the cable is P_2 and the point farthest downwind is P_3. Since P_1 and P_4 are in a vertical line $\xi_4 = \xi_1$ Also $y_4/s_4 = (\eta_4 - \eta_1)/(\sigma_4 - \sigma_1) = 1/2.83 = 0.353$ where y_4 is the vertical distance between P_1 and P_4 and s_4 is the total length of cable, 2.83 feet. To find the values which satisfy these two conditions the following method will be employed. Choosing values of ϕ_4, values of ξ_4, η_4, and σ_4 are obtained
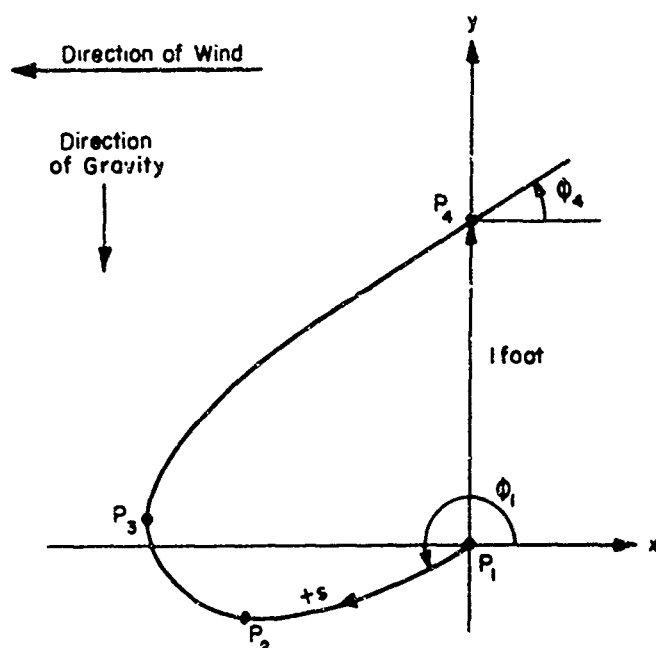
Figure 7 - Configuration of a String in a Stream with
Ends Fastened 1 Foot Apart in Direction of Gravity

from Table 4. Then interpolation is made in Table 2 for values which correspond to $\xi_1 = \xi_4$ so that the ratios $(\eta_4 - \eta_1)/(\sigma_4 - \sigma_1)$ can be calculated. Thus the following table is constructed:

ϕ_4	σ_4	η_4	ξ_4	τ_4	ϕ_1	σ_1	η_1	ξ_1	τ_1	$\dfrac{\eta_4 - \eta_1}{\sigma_4 - \sigma_1}$
32	9.6152	6.0100	2.3318	2.8220	204.98	-2.4388	0.6437	2.3318	1.2468	0.4452
31.5	10.6278	6.5381	3.1958	2.9998	207.47	-3.4044	1.0744	3.1958	1.3952	0.3894
31	11.6405	7.0662	4.0598	3.1775	208.64	-4.3852	1.5385	4.0598	1.5540	0.3449
31.09	11.4562	6.9701	3.9025	3.1452	208.43	-4.2067	1.4540	3.9025	1.5251	0.3530

The values corresponding to $\dfrac{\eta_4 - \eta_1}{\sigma_4 - \sigma_1} = 0.353$ are given on the last line and were found by interpolation in the table. The ratio $\dfrac{T_1}{R}$ can now be computed from the relation $\dfrac{T_1}{R} = \dfrac{\tau_1 y}{\eta_4 - \eta_1} = \dfrac{1.5251}{5.5161} = 0.2765$.

The cable functions for P_2 where $\phi_2 = 180°$ are $\sigma_2 = \eta_2 = \xi_2 = 0$ and $\tau_2 = 1$. The cable function for P_3 where $\phi_3 = 90°$ are found either in Table 3 or Table 4 and are $\sigma_3 = 3.0658$; $\eta_3 = 1.6061$; $\xi_3 = -2.2445$; $\tau_3 = 1.3871$. The location of P_2 with reference to P_1 is given by:

$$x_2 = \frac{(\xi_2 - \xi_1)}{\tau_1} \frac{T_1}{R} = \frac{-3.9025}{1.5251}(0.2765) \text{ feet} = -0.71 \text{ feet}$$

$$y_2 = \frac{(\eta_2 - \eta_1)}{\tau_1} \frac{T_1}{R} = \frac{(-1.4540)(0.2765)}{1.5251} \text{ feet} = -0.26 \text{ feet}$$

The location of P_3 with reference to P_1 is given by

$$x_3 = \frac{(\xi_3 - \xi_1)}{\tau_1} \frac{T_1}{R} = \frac{(-2.2445 - 3.9025)(0.2765)}{1.5251} \text{ feet} = -1.11 \text{ feet}$$

$$y_3 = \frac{(\eta_3 - \eta_1)}{\tau_1} \frac{T_1}{R} = \frac{(1.6061 - 1.4540)(0.2765)}{1.5251} \text{ feet} = 0.028 \text{ feet}$$

APPENDIX 1

NUMERICAL METHODS USED FOR THE CONSTRUCTION OF THE TABLES

The computations were carried out partly by hand with the use of desk calculators but mainly with the use of International Business Machines computing equipment. Initially IBM equipment installed at the David Taylor Model Basin was used. Before completion of the work, however, this equipment was removed from the Taylor Model Basin and the computations were then completed at the Bureau of Standards Computation Laboratory.

The values of the parameter f for which the cable functions have been evaluated are 0.01, 0.02, and 0.03. Because values of the cable functions are relatively insensitive to changes in this parameter, interpolation for values of f in the range 0.01 to 0.03 should be satisfactory. Past experience indicates that the value of f applicable to any round cable will fall within this range. On the other hand, for a faired cable, values of f ten times as great may be anticipated. The assumptions made above regarding the hydrodynamic force acting on an element of cable may not apply with sufficient accuracy to the case of a faired cable and until sufficient experimental work is done to establish the appropriate laws for the hydrodynamic force acting on a faired cable it is felt that the preparation of tables to cover this case is not justified.

The following values of the parameter ϕ_c and the related parameter w are covered in the tables:

ϕ_c degrees	w	ϕ_c degrees	w
0	0	45	0.707107
5	0.007625	50	0.912936
10	0.030619	55	1.16987
15	0.069350	60	1.50000
20	0.124485	65	1.94358
25	0.197070	70	2.58178
30	0.288675	75	3.60488
35	0.401623	80	5.58512
40	0.539363	85	11.38656

In many problems, interpolation for other values of the critical angle can be avoided by judicious choice of towing speeds. Small values of the critical angle, i.e., in the range of 0 to 5 degrees, occur frequently. It would be desirable to have tables for this range with a smaller interval of ϕ_c and it is

hoped that the tables can be extended to include this range in the future. The case of $\phi_c = \pi/2$ can arise only when the speed of towing is reduced to zero and the determination of configuration of the cable is then a simple matter. For the case $\phi = 0$ the cable configuration is symmetrical about a line parallel to the direction of motion. Therefore in this case the cable functions are required only for Quadrant 1.

The main difficulty in evaluating the cable functions arises from the divergence of the functions in the region near the critical angle. This divergence is most rapid for $\phi_c = 0$. Th   case was treated separately and is discussed in Appendix 4. Also for othe   ilues of the critical angle special methods were used for values of ϕ wit$^!$ of the critical angle. These methods are described in Appendix 3.

Otherwise the numerical integrations were made using Simpson's One-Third Rule:

$$\int_{z_0}^{z+2h} y \, dx = \frac{h}{3} (y_0 + 4y_1 + y_2)$$

together with a correction term involving fourth differences.[15] The interval chosen was 1°, i.e., h = 0.01745329, and the interval factor h/3 was always applied before the summation process and treated as a part of the integral, i.e., the form $\frac{h}{3} y_0 + 4\left(\frac{h}{3} y_1\right) + \frac{h}{3} y_2$ was used. The starting points for evaluating the functions at even values of ϕ were always at $\phi = 90°$ for Quadrant 1 (Table 1) and at $\phi = 180°$ for Quadrants 2 and 3. The starting points for evaluating the functions at odd values of ϕ were $\phi = 89°$ for Quadrant 1, 179° for Quadrant 2 and 181° for Quadrant 3. To obtain initial values of the functions at the latter starting points separate integrations were made using a smaller interval.

Although the function τ is integrable in closed form, see Appendix 2, the expressions obtained are so complicated that in general it was preferable to compute τ by numerical integration. The formulas given for τ in Appendix 2 were used only for checking purposes and for evaluation of τ in the region close to the critical angle, see Appendix 3. The integrands for computing $\ln \tau$ were evaluated to a minimum of six decimal places. The values of τ obtained by numerical integration were checked with values of τ computed by means of the formula given in Appendix 2 at the extreme points of the integrations, i.e., at $\phi = \phi_c + 5°$ in Quadrant 1, at $\phi = 90°$ in Quadrant 2, and at $\phi = 175° + \phi_c$ in Quadrant 3. The largest difference was found to be 0.00001. The conversion from $\ln \tau$ to τ was made with the use of the W.P.A. Exponential tables,[16] which were transcribed to IBM cards for the purpose.

The integrands for the functions σ, ξ, and η were evaluated to six decimal places. The fourth differences which were needed for computations of the correction to Simpson's Rule served as a check upon the integrands. In addition the equations for τ as a function of σ and η as given by Equations [17e], [18e], and [19e], were used to check the integrations. The deviations of τ from the values computed from these equations exceeds 0.0001 only for a few cases where the critical angle was 75°, 80°, or 85° and the values of the functions were large. The maximum deviation was less than 0.0004. An absolute error of 0.00001 in $\ln \tau$ would cause a relative error in τ and hence in σ, ξ, and η of 0.001 percent. The deviations always indicated that the relative error in the functions was less than this amount.

APPENDIX 2

THE INTEGRATION OF $\ln \tau$

From Equation [17a] for Quadrant 1

$$\ln \tau = \int_{\pi/2}^{\phi} \frac{f + w \sin \phi}{-\sin^2 \phi + w \cos \phi} d\phi \qquad [20]$$

But the denominator of the integrand can be factored, i.e.,

$$-\sin^2 \phi + w \cos \phi = (\cos \phi - \cos \phi_c)(\cos \phi + \sec \phi_c) \qquad [21]$$

since $w = \sec \phi_c - \cos \phi_c$ from [18b].

So that $1/-\sin^2 \phi + w \cos \phi$ can be written

$$\frac{1}{-\sin^2 \phi + w \cos \phi} = \frac{1}{\sec \phi_c + \cos \phi_c} \left[\frac{1}{\cos \phi - \cos \phi_c} - \frac{1}{\cos \phi + \sec \phi_c} \right] \qquad [22]$$

Hence

$$\ln \tau = \frac{1}{\sec \phi_c + \cos \phi_c} \left\{ f \left[\int_{\pi/2}^{\phi} \frac{d\phi}{\cos \phi - \cos \phi_c} - \int_{\pi/2}^{\phi} \frac{d\phi}{\cos \phi + \sec \phi_c} \right] \right.$$

$$\left. + w \left[\int_{\pi/2}^{\phi} \frac{\sin \phi \, d\phi}{\cos \phi - \cos \phi_c} - \int_{\pi/2}^{\phi} \frac{\sin \phi \, d\phi}{\cos \phi + \sec \phi_c} \right] \right\} \qquad [23]$$

The integrals that appear in this equation are listed in Pierce's Tables of Integrals.[17] Upon integration

$$\ln \tau = \frac{1}{\sec \phi_c + \cos \phi_c} \left\{ f \left[\csc \phi_c \ln \left(\frac{\tan \frac{\phi}{2} + \tan \frac{\phi_c}{2}}{\tan \frac{\phi}{2} - \tan \frac{\phi_c}{2}} \right) - 2 \cot \phi_c \tan^{-1} \left(\tan \frac{\phi_c}{2} \tan \frac{\phi}{2} \right) \right] \right.$$

$$\left. + w \ln \frac{\cos \phi + \sec \phi_c}{\cos \phi - \cos \phi_c} \right\} \Bigg|_{\pi/2}^{\phi} \qquad [24]$$

From Equation [18a] for Quadrant 2

$$\ln \tau = \int_{\pi}^{\phi} \frac{-f + w \sin \phi}{-\sin^2 \phi + w \cos \phi} d\phi = \int_{0}^{\phi'} \frac{-f + w \sin \phi'}{\sin^2 \phi' + w \cos \phi'} d\phi' \quad [25]$$

where $\phi' = \pi - \phi$. But

$$\frac{1}{\sin^2 \phi' + w \cos \phi'} = \frac{1}{\sec \phi_c + \cos \phi_c}\left[\frac{1}{\cos \phi_c + \cos \phi'} + \frac{1}{\sec \phi_c - \cos \phi'}\right] \quad [26]$$

So that

$$\ln \tau = \frac{1}{\sec \phi_c + \cos \phi_c}\left\{-f\left[\int_{0}^{\phi'} \frac{d\phi'}{\cos \phi_c + \cos \phi'} + \int_{0}^{\phi'} \frac{d\phi'}{\sec \phi_c - \cos \phi'}\right]\right.$$

$$\left. + w\left[\int_{0}^{\phi'} \frac{\sin \phi' d\phi'}{\cos \phi_c + \cos \phi'} + \int_{0}^{\phi'} \frac{\sin \phi' d\phi'}{\sec \phi_c - \cos \phi'}\right]\right\} \quad [27]$$

Using Pierce's Tables of Integrals[17] to evaluate the integrals

$$\ln \tau = \frac{1}{\sec \phi_c + \cos \phi_c}\left\{f\left[\csc \phi_c \ln\left(\frac{1 - \tan \frac{\phi_c}{2} \tan \frac{\phi'}{2}}{1 + \tan \frac{\phi_c}{2} \tan \frac{\phi'}{2}}\right) - 2 \cot \phi_c \tan^{-1}\left(\frac{\tan \frac{\phi'}{2}}{\tan \frac{\phi_c}{2}}\right)\right]\right.$$

$$\left. + w\left[\ln \frac{\sec \phi_c - \cos \phi'}{\cos \phi_c + \cos \phi'}\right]\right\}\Bigg|_{0}^{\phi'} \quad [28]$$

From Equation [19a] in Quadrant 3

$$\ln \tau = \int_{\pi}^{\phi} \frac{-f + w \sin \phi}{+\sin^2 \phi + w \cos \phi} d\phi = \int_{0}^{\phi''} \frac{f + w \sin \phi''}{-\sin^2 \phi'' + w \sin \phi''} d\phi'' \quad [29]$$

where $\phi'' = \phi - \pi$. The integrand in the last expression is exactly the same as that obtained for Quadrant 1 so that in this case

$$\ln \tau = \frac{1}{\sec \phi_c + \cos \phi_c}\left\{f\left[\csc \phi_c \ln\left(\frac{\tan \frac{\phi_c}{2} + \tan \frac{\phi''}{2}}{\tan \frac{\phi_c}{2} - \tan \frac{\phi''}{2}}\right) - 2 \cot \phi_c \tan^{-1}\left(\tan \frac{\phi_c}{2} \tan \frac{\phi''}{2}\right)\right.\right.$$

$$\left.\left. + w \ln\left[\frac{\cos \phi'' + \sec \phi_c}{\cos \phi'' - \cos \phi_c}\right]\right\}\right|_{0}^{\phi''} \quad [30]$$

APPENDIX 3

TECHNIQUES USED IN THE REGION NEAR THE CRITICAL ANGLE

To evaluate the cable functions in the region of Quadrant 1 where $\phi_c + 5° \geq \phi \geq \phi_c + 1°$ (except for $\phi_c = 0$), the following methods were used: The values of τ were not obtained by numerical integration but were computed by use of Equation [24] of Appendix 2. Instead of integrating for the functions η and ξ directly the better behaved functions, $\bar{\eta}$ and $\bar{\xi}$, where

$$\bar{\eta} = \eta - \sin \phi_c \sigma; \quad d\bar{\eta} = \frac{\tau(\sin \phi - \sin \phi_c)}{-\sin^2 \phi + w \cos \phi} d\phi \qquad [31]$$

and

$$\bar{\xi} = \xi - \cos \phi_c \sigma; \quad d\bar{\xi} = \frac{\tau(\cos \phi - \cos \phi_c)}{-\sin^2 \phi + w \cos \phi} d\phi \qquad [32]$$

were first evaluated by numerical integration. Simpson's Rule was used again but the interval of integration was reduced to one-half degree. By eliminating η in [17e] and [31] and solving for σ it is found that

$$\sigma = \frac{\tau - 1 - w\bar{\eta}}{1 + w \sin \phi_c} \qquad [33]$$

The values of σ were thus computed from the values of τ and $\bar{\eta}$. Having computed σ the values of η and ξ were found using [31] and [32].

The procedure used for computing the cable functions in the region of Quadrant 3 where $\phi_c + 175° \leq \phi \leq \phi_c + 179°$ was exactly analogous to the procedure described above for Quadrant 1.

Since no independent method of checking was available for these regions the work was checked by repeating the calculation.

APPENDIX 4

TECHNIQUES USED FOR THE CASE $\phi_c = 0$

Although the formulas for the cable functions given in Equations [12a] to [12d] can be applied in many cases where $\phi_c = 0$ the function defined by [16a] to [16d] were also evaluated for $\phi_c = 0$. This was done for two reasons: First because the modification of the law of hydrodynamic force that was made in obtaining the Equations [12a] to [12d] has a significant effect when the value of ϕ is small, and secondly in order to obtain a set of cable functions for $\phi_c = 0$ consistent with those computed for the other critical angles. As mentioned above, because of the symmetry of the cable configuration that obtains for $\phi_c = 0$, in this case the functions need be evaluated only for Quadrant 1. The functions take on particularly simple forms. From Equations [17a] to [17d], with w = 0,

$$\ln \tau = -\int_{\pi/2}^{\phi} \frac{f}{\sin^2 \phi}\, d\phi = f \cot \phi \qquad [34a]$$

$$\sigma = -\int_{\pi/2}^{\phi} e^{f \cot \phi} \csc^2 \phi\, d\phi = \frac{e^{f \cot \phi} - 1}{f} \qquad [34b]$$

$$\xi = -\int_{\pi/2}^{\phi} e^{f \cot \phi} \cot \phi\ \csc \phi\, d\phi \qquad [34c]$$

$$\eta = -\int_{\pi/2}^{\phi} e^{f \cot \phi} \csc \phi\ d\phi \qquad [34d]$$

It is seen that the functions τ and σ are integrable in closed form and hence numerical integrations are not required for computing these functions. However, numerical integrations are required for the functions ξ and η.

The cable functions diverge more rapidly for $\phi_c = 0$ than for the other critical angles. Also the method described in Appendix 2 for reducing the rate of divergence is not applicable. However because of the ease of computing the integrands the use of much smaller intervals of integration is not precluded. For the region $90° \geq \phi \geq 25°$ the functions were computed by numerical integration using Simpson's Rule and a $1°$ interval in the same manner as for the other critical angles. For ϕ smaller than $25°$, τ and σ were computed with the use of Equations [34a] and [34b]. The functions ξ and η were computed by numerical integrations using Simpson's Rule, and the following intervals of ϕ:

Range of ϕ	Interval of ϕ
$25° > \phi > 15°$	$0.5°$
$15° > \phi > 10°$	$0.25°$
$10° > \phi > 5°$	$0.1°$
$5° > \phi > 1.1°$	$.05°$
$1.1° > \phi > 1°$	$.01°$

This work was checked by repeating the calculation.

PERSONNEL

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TABLE 1 - QUADRANT 1

Reference Point at $\phi = 90°$

$$\phi_0 = 0°$$

ϕ'	τ			e		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
1.0	1.7734	3.1450	5.5773	79.3402	107.248	152.576
1.2	1.6119	2.5981	4.1878	61.1870	79.9062	106.261
1.4	1.5096	2.2668	3.4128	50.5374	63.576	80.4255
1.6	1.4395	2.0463	2.9271	43.0474	52.3127	64.2371
1.8	1.3747	1.8897	2.5977	37.4658	44.4843	53.2557
2.0	1.3316	1.7731	2.3610	33.1575	38.6546	45.3668
2.2	1.2973	1.6831	2.1835	29.7329	34.1531	39.4495
2.4	1.2695	1.6115	2.0458	26.9462	30.5766	34.8593
2.6	1.2463	1.5534	1.9361	24.6347	27.6691	31.2018
2.8	1.2269	1.5052	1.8467	22.6868	25.2603	28.2230
3.0	1.2102	1.4647	1.7726	21.0231	23.2330	25.7526
3.2	1.1959	1.4301	1.7102	19.5857	21.5037	23.6722
3.4	1.1833	1.4007	1.6569	18.3314	20.0116	21.8972
3.6	1.1723	1.3742	1.6110	17.2274	18.7113	20.3656
3.8	1.1625	1.3514	1.5709	16.2482	17.5692	19.0312
4.0	1.1537	1.3311	1.5358	15.3737	16.5555	17.8584
4.2	1.1459	1.3130	1.5046	14.5881	15.6522	16.8198
4.4	1.1388	1.2968	1.4768	13.8785	14.8415	15.8937
4.6	1.1323	1.2822	1.4519	13.2342	14.1099	15.0629
4.8	1.1265	1.2689	1.4294	12.6468	13.4465	14.3136
5.0	1.1211	1.2568	1.4090	12.1039	12.8420	13.6343
5.5	1.1094	1.2309	1.3656	10.9439	11.5427	12.1852
6.0	1.0998	1.2096	1.3303	9.9817	10.4798	11.0112
6.5	1.0917	1.1919	1.3012	9.1737	9.5943	10.0608
7.0	1.0849	1.1769	1.2768	8.4852	8.8452	9.2255
7.5	1.0789	1.1641	1.2559	7.8918	8.2031	8.5309
8.0	1.0737	1.1529	1.2380	7.3746	7.6465	7.9319
8.5	1.0692	1.1432	1.2223	6.9202	7.1595	7.4100
9.0	1.0652	1.1346	1.2085	6.5173	6.7297	6.9513
9.5	1.0616	1.1270	1.1963	6.1580	6.3475	6.5449
10.0	1.0584	1.1201	1.1855	5.8352	6.0054	6.1823
10.5	1.0554	1.1139	1.1757	5.5437	5.6974	5.8568
11.0	1.0528	1.1084	1.1669	5.2792	5.4185	5.5628
11.5	1.0504	1.1033	1.1589	5.0380	5.1649	5.2960
12.0	1.0482	1.0987	1.1516	4.8171	4.9331	5.0528
12.5	1.0461	1.0944	1.1449	4.6140	4.7204	4.8302
13.0	1.0443	1.0905	1.1388	4.4267	4.5246	4.6255
13.5	1.0425	1.0869	1.1331	4.2533	4.3437	4.4367
14.0	1.0409	1.0835	1.1279	4.0923	4.1760	4.2621
14.5	1.0394	1.0804	1.1230	3.9424	4.0202	4.0999
15.0	1.0380	1.0775	1.1185	3.8026	3.8749	3.9490
16.0	1.0355	1.0722	1.1103	3.5489	3.6119	3.6764
17.0	1.0332	1.0676	1.1031	3.3249	3.3802	3.4367
18.0	1.0313	1.0635	1.0967	3.1255	3.1744	3.2243
19.0	1.0295	1.0598	1.0910	2.9468	2.9902	3.0345
20.0	1.0279	1.0565	1.0859	2.7856	2.8244	2.8639
21.0	1.0264	1.0535	1.0813	2.6393	2.6741	2.7096
22.0	1.0251	1.0507	1.0771	2.5060	2.5374	2.5693
23.0	1.0238	1.0482	1.0732	2.3838	2.4122	2.4411
24.0	1.0227	1.0459	1.0697	2.2714	2.2972	2.3235
25.0	1.0217	1.0438	1.0665	2.1677	2.1912	2.2150

34.

$\phi°$	ξ			η		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
1.0	76.3262	106.207	151.503	5.3980	6.3005	7.5731
1.2	60.1759	78.8706	105.197	5.0900	5.7800	6.6927
1.4	49.5490	62.3062	79.3679	4.8500	5.4062	6.1104
1.6	42.0416	51.2851	63.1850	4.6541	5.1188	5.6886
1.8	36.4625	43.4601	52.2085	4.4590	4.8873	5.3640
2.0	32.1565	37.6336	44.3239	4.3465	4.6945	5.1031
2.2	28.7342	33.1351	38.4105	4.2212	4.5299	4.8868
2.4	25.9497	29.5615	33.8240	4.1095	4.3865	4.7029
2.6	23.6405	26.6567	30.1699	4.0088	4.2599	4.5436
2.8	21.6947	24.2506	27.1944	3.9171	4.1465	4.4034
3.0	20.0331	22.2259	24.7272	3.8330	4.0441	4.2786
3.2	18.5978	20.4991	22.6498	3.7554	3.9506	4.1662
3.4	17.3456	19.0095	20.8778	3.6832	3.8648	4.0641
3.6	16.2437	17.7116	19.3491	3.6158	3.7855	3.9706
3.8	15.2665	16.5709	18.0174	3.5527	3.7117	3.8846
4.0	14.3941	15.5605	16.8473	3.4932	3.6429	3.8048
4.2	13.6105	14.6595	15.8114	3.4371	3.5783	3.7306
4.4	12.9028	13.8511	14.8879	3.3839	3.5176	3.6612
4.6	12.2605	13.1218	14.0597	3.3334	3.4602	3.5961
4.8	11.6751	12.4606	13.3129	3.2853	3.4059	3.5347
5.0	11.1392	11.8583	12.6361	3.2393	3.3543	3.4767
5.5	9.9790	10.5644	11.1930	3.1329	3.2356	3.3463
6.0	9.0216	9.5069	10.0249	3.0366	3.1292	3.2269
6.5	8.2183	8.6267	9.0603	2.9487	3.0329	3.1213
7.0	7.5347	7.8827	8.2506	2.8679	2.9450	3.0256
7.5	6.9459	7.2457	7.5615	2.7931	2.8640	2.9380
8.0	6.4336	6.6943	6.9680	2.7234	2.7890	2.8573
8.5	5.9838	6.2123	6.4515	2.6582	2.7192	2.7825
9.0	5.5857	5.7874	5.9981	2.5970	2.6538	2.7127
9.5	5.2309	5.4102	5.5970	2.5392	2.5924	2.6475
10.0	4.9128	5.0731	5.2396	2.4846	2.5345	2.5861
10.5	4.6260	4.7699	4.9193	2.4328	2.4797	2.5282
11.0	4.3661	4.4960	4.6305	2.3834	2.4277	2.4734
11.5	4.1295	4.2472	4.3688	2.3364	2.3783	2.4213
12.0	3.9133	4.0202	4.1307	2.2914	2.3311	2.3718
12.5	3.7148	3.8124	3.9131	2.2483	2.2860	2.3246
13.0	3.5321	3.6215	3.7135	2.2070	2.2428	2.2794
13.5	3.3633	3.4454	3.5298	2.1673	2.2013	2.2362
14.0	3.2070	3.2825	3.3601	2.1290	2.1614	2.1947
14.5	3.0617	3.1314	3.2029	2.0921	2.1231	2.1548
15.0	2.9265	2.9909	3.0570	2.0565	2.0861	2.1164
16.0	2.6820	2.7375	2.7943	1.9888	2.0159	2.0435
17.0	2.4673	2.5153	2.5645	1.9252	1.9501	1.9755
18.0	2.2771	2.3190	2.3618	1.8653	1.8883	1.9117
19.0	2.1076	2.1444	2.1819	1.8086	1.8299	1.8515
20.0	1.9556	1.9880	2.0211	1.7548	1.7745	1.7946
21.0	1.8186	1.8473	1.8765	1.7036	1.7219	1.7406
22.0	1.6945	1.7200	1.7460	1.6548	1.6718	1.6892
23.0	1.5817	1.6044	1.6275	1.6080	1.6239	1.6401
24.0	1.4786	1.4990	1.5196	1.5632	1.5781	1.5932
25.0	1.3842	1.4024	1.4210	1.5202	1.5341	1.5482

	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03

ϕ^c	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
5	1.1211	1.2568	1.4090	12.1089	12.8420	13.6343
6	1.0998	1.2096	1.3303	9.9817	10.4798	11.0112
7	1.0849	1.1769	1.2768	8.4852	8.8452	9.2255
8	1.0737	1.1529	1.2380	7.3746	7.6465	7.9319
9	1.0652	1.1346	1.2085	6.5173	6.7297	6.9513
10	1.0584	1.1201	1.1855	5.8352	6.0054	6.1823
11	1.0528	1.1084	1.1669	5.2792	5.4185	5.5628
12	1.0482	1.0987	1.1516	4.8171	4.9331	5.0528
13	1.0443	1.0905	1.1388	4.4267	4.5246	4.6255
14	1.0409	1.0835	1.1279	4.0923	4.1760	4.2621
15	1.0380	1.0775	1.1185	3.8026	3.8749	3.9490
16	1.0355	1.0722	1.1103	3.5489	3.6119	3.6764
17	1.0332	1.0676	1.1031	3.3249	3.3802	3.4367
18	1.0313	1.0635	1.0967	3.1255	3.1744	3.2243
19	1.0295	1.0598	1.0910	2.9468	2.9902	3.0345
20	1.0279	1.0565	1.0859	2.7856	2.8244	2.8639
21	1.0264	1.0535	1.0813	2.6393	2.6741	2.7096
22	1.0251	1.0507	1.0771	2.5060	2.5374	2.5693
23	1.0238	1.0482	1.0732	2.3838	2.4122	2.4411
24	1.0227	1.0459	1.0697	2.2715	2.2972	2.3235
25	1.0217	1.0438	1.0665	2.1677	2.1912	2.2150
26	1.0207	1.0419	1.0634	2.0715	2.0929	2.1147
27	1.0198	1.0400	1.0606	1.9820	2.0016	2.0216
28	1.0190	1.0383	1.0580	1.8985	1.9165	1.9348
29	1.0182	1.0367	1.0556	1.8204	1.8370	1.8538
30	1.0175	1.0352	1.0533	1.7471	1.7624	1.7779
31	1.0168	1.0338	1.0512	1.6782	1.6923	1.7065
32	1.0161	1.0325	1.0492	1.6132	1.6262	1.6394
33	1.0155	1.0313	1.0473	1.5518	1.5638	1.5760
34	1.0149	1.0301	1.0455	1.4936	1.5048	1.5160
35	1.0144	1.0290	1.0438	1.4384	1.4487	1.4592
36	1.0139	1.0279	1.0422	1.3859	1.3955	1.4052
37	1.0134	1.0269	1.0406	1.3359	1.3448	1.3538
38	1.0129	1.0259	1.0391	1.2882	1.2965	1.3048
39	1.0124	1.0250	1.0377	1.2426	1.2503	1.2581
40	1.0120	1.0241	1.0364	1.1989	1.2061	1.2133
41	1.0116	1.0233	1.0351	1.1570	1.1637	1.1705
42	1.0112	1.0225	1.0339	1.1168	1.1230	1.1293
43	1.0108	1.0217	1.0327	1.0781	1.0839	1.0898
44	1.0104	1.0209	1.0316	1.0409	1.0463	1.0518
45	1.0100	1.0202	1.0305	1.0050	1.0101	1.0152
46	1.0097	1.0195	1.0294	.9704	.9751	.9798
47	1.0094	1.0188	1.0284	.9369	.9413	.9457
48	1.0090	1.0182	1.0274	.9045	.9086	.9127
49	1.0087	1.0175	1.0264	.8731	.8769	.8807

36.

$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
5	11.1392	11.8583	12.6361	3.2393	3.3543	3.4767
6	9.0216	9.5069	10.0249	3.0366	3.1292	3.2269
7	7.5347	7.8827	8.2506	2.8679	2.9450	3.0256
8	6.4336	6.6943	6.9680	2.7234	2.7890	2.8573
9	5.5857	5.7874	5.9981	2.5970	2.6538	2.7127
10	4.9128	5.0731	5.2396	2.4846	2.5345	2.5861
11	4.3661	4.4960	4.6305	2.3834	2.4277	2.4734
12	3.9133	4.0202	4.1307	2.2914	2.3311	2.3718
13	3.5321	3.6215	3.7135	2.2070	2.2428	2.2794
14	3.2070	3.2825	3.3601	2.1290	2.1615	2.1947
15	2.9265	2.9909	3.0570	2.0565	2.0861	2.1164
16	2.6821	2.7375	2.7943	1.9888	2.0159	2.0435
17	2.4673	2.5153	2.5645	1.9252	1.9501	1.9755
18	2.2771	2.3190	2.3618	1.8653	1.8883	1.9117
19	2.1076	2.1444	2.1819	1.8086	1.8299	1.8515
20	1.9556	1.9880	2.0211	1.7548	1.7745	1.7946
21	1.8186	1.8473	1.8765	1.7036	1.7219	1.7406
22	1.6945	1.7200	1.7460	1.6548	1.6718	1.6892
23	1.5817	1.6044	1.6275	1.6080	1.6239	1.6401
24	1.4786	1.4990	1.5196	1.5632	1.5781	1.5932
25	1.3842	1.4024	1.4210	1.5202	1.5341	1.5482
26	1.2973	1.3138	1.3304	1.4788	1.4918	1.5051
27	1.2173	1.2321	1.2471	1.4389	1.4511	1.4635
28	1.1432	1.1566	1.1701	1.4004	1.4118	1.4235
29	1.0746	1.0867	1.0989	1.3631	1.3739	1.3848
30	1.0108	1.0218	1.0328	1.3270	1.3372	1.3474
31	.9514	.9613	.9714	1.2920	1.3016	1.3113
32	.8960	.9050	.9141	1.2581	1.2671	1.2762
33	.8442	.8524	.8606	1.2251	1.2335	1.2421
34	.7957	.8031	.8106	1.1930	1.2010	1.2090
35	.7502	.7569	.7638	1.1617	1.1692	1.1768
36	.7074	.7136	.7198	1.1312	1.1383	1.1455
37	.6672	.6729	.6785	1.1015	1.1082	1.1149
38	.6293	.6345	.6397	1.0724	1.0787	1.0851
39	.5936	.5983	.6031	1.0440	1.0500	1.0560
40	.5599	.5642	.5685	1.0163	1.0219	1.0275
41	.5281	.5320	.5359	.9891	.9944	.9997
42	.4980	.5016	.5051	.9624	.9674	.9725
43	.4695	.4727	.4760	.9363	.9410	.9458
44	.4425	.4455	.4484	.9107	.9151	.9196
45	.4169	.4196	.4223	.8855	.8897	.8939
46	.3926	.3951	.3975	.8608	.8647	.8687
47	.3695	.3718	.3740	.8365	.8402	.8440
48	.3476	.3497	.3517	.8126	.8161	.8196
49	.3268	.3287	.3305	.7891	.7924	.7957

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$\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
50	1.0084	1.0169	1.0255	.8426	.8462	.8498
51	1.0081	1.0163	1.0246	.8131	.8164	.8197
52	1.0078	1.0157	1.0237	.7843	.7874	.7905
53	1.0076	1.0152	1.0229	.7564	.7593	.7621
54	1.0073	1.0146	1.0220	.7292	.7318	.7345
55	1.0070	1.0141	1.0212	.7027	.7051	.7076
56	1.0068	1.0136	1.0204	.6768	.6791	.6814
57	1.0065	1.0131	1.0197	.6515	.6536	.6558
58	1.0063	1.0126	1.0189	.6268	.6288	.6308
59	1.0060	1.0121	1.0182	.6027	.6045	.6063
60	1.0058	1.0116	1.0175	.5790	.5807	.5824
61	1.0056	1.0111	1.0168	.5558	.5574	.5590
62	1.0053	1.0107	1.0161	.5331	.5345	.5360
63	1.0051	1.0102	1.0154	.5108	.5121	.5134
64	1.0049	1.0098	1.0147	.4889	.4901	.4913
65	1.0047	1.0094	1.0141	.4674	.4685	.4696
66	1.0045	1.0089	1.0134	.4462	.4472	.4482
67	1.0043	1.0085	1.0128	.4254	.4263	.4272
68	1.0040	1.0081	1.0122	.4048	.4057	.4065
69	1.0038	1.0077	1.0116	.3846	.3853	.3861
70	1.0036	1.0073	1.0110	.3646	.3653	.3660
71	1.0034	1.0069	1.0104	.3449	.3455	.3461
72	1.0033	1.0065	1.0098	.3254	.3260	.3265
73	1.0031	1.0061	1.0092	.3062	.3067	.3071
74	1.0029	1.0058	1.0086	.2872	.2876	.2880
75	1.0027	1.0054	1.0081	.2683	.2687	.2690
76	1.0025	1.0050	1.0075	.2496	.2500	.2503
77	1.0023	1.0046	1.0070	.2311	.2314	.2317
78	1.0021	1.0043	1.0064	.2128	.2130	.2132
79	1.0019	1.0039	1.0058	.1946	.1948	.1949
80	1.0018	1.0035	1.0053	.1765	.1766	.1768
81	1.0016	1.0032	1.0048	.1585	.1586	.1588
82	1.0014	1.0028	1.0042	.1406	.1407	.1408
83	1.0012	1.0025	1.0037	.1229	.1229	.1230
84	1.0011	1.0021	1.0032	.1052	.1052	.1053
85	1.0009	1.0018	1.0026	.0875	.0876	.0876
86	1.0007	1.0014	1.0021	.0700	.0700	.0700
87	1.0005	1.0010	1.0016	.0524	.0524	.0525
88	1.0003	1.0007	1.0010	.0349	.0349	.0349
89	1.0002	1.0003	1.0005	.0175	.0175	.0175
90	1.0000	1.0000	1.0000	.0000	.0000	.0000

38

ϕ'	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
50	.3071	.3088	.3104	.7660	.7690	.7721
51	.2883	.2898	.2913	.7432	.7460	.7490
52	.2704	.2718	.2732	.7207	.7234	.7261
53	.2534	.2546	.2559	.6985	.7010	.7036
54	.2372	.2383	.2394	.6766	.6790	.6814
55	.2218	.2228	.2238	.6551	.6573	.6595
56	.2071	.2081	.2090	.6337	.6358	.6379
57	.1932	.1940	.1948	.6127	.6146	.6165
58	.1799	.1807	.1814	.5918	.5936	.5954
59	.1673	.1680	.1686	.5712	.5729	.5746
60	.1553	.1559	.1565	.5509	.5524	.5540
61	.1439	.1444	.1449	.5307	.5321	.5336
62	.1330	.1335	.1340	.5107	.5120	.5134
63	.1227	.1232	.1236	.4909	.4922	.4934
64	.1130	.1133	.1137	.4713	.4725	.4736
65	.1037	.1040	.1043	.4519	.4529	.4540
66	.0949	.0952	.0955	.4326	.4336	.4345
67	.0866	.0868	.0871	.4135	.4144	.4153
68	.0787	.0790	.0792	.3946	.3953	.3961
69	.0713	.0715	.0717	.3757	.3764	.3772
70	.0643	.0645	.0646	.3570	.3577	.3583
71	.0577	.0579	.0580	.3384	.3390	.3396
72	.0516	.0517	.0518	.3200	.3205	.3210
73	.0458	.0459	.0460	.3016	.3021	.3025
74	.0404	.0405	.0405	.2834	.2838	.2842
75	.0353	.0354	.0355	.2652	.2655	.2659
76	.0307	.0307	.0308	.2471	.2474	.2477
77	.0263	.0264	.0264	.2291	.2294	.2297
78	.0224	.0224	.0224	.2112	.2114	.2117
79	.0187	.0188	.0188	.1934	.1935	.1937
80	.0154	.0155	.0155	.1756	.1757	.1759
81	.0125	.0125	.0125	.1579	.1580	.1581
82	.0098	.0098	.0099	.1402	.1403	.1404
83	.0075	.0075	.0075	.1226	.1226	.1227
84	.0055	.0055	.0055	.1050	.1050	.1051
85	.0038	.0038	.0038	.0874	.0875	.0875
86	.0024	.0024	.0024	.0699	.0699	.0699
87	.0014	.0014	.0014	.0524	.0524	.0524
88	.0006	.0006	.0006	.0349	.0349	.0349
89	.0002	.0002	.0002	.0175	.0175	.0175
90	.0000	.0000	.0000	.0000	.0000	.0000

$$\phi_c = 5°$$

$\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
6	1.1784	1.3517	1.5505	14.9867	16.0926	17.3068
7	1.1347	1.2570	1.3925	10.9586	11.5512	12.1863
8	1.1116	1.2085	1.3140	8.8553	9.2428	9.6528
9	1.0965	1.1775	1.2646	7.4962	7.7742	8.0658
10	1.0855	1.1554	1.2299	6.5251	6.7358	6.9556
11	1.0771	1.1387	1.2038	5.7880	5.9540	6.1263
12	1.0704	1.1255	1.1834	5.2056	5.3399	5.4789
13	1.0649	1.1147	1.1669	4.7316	4.8426	4.9571
14	1.0603	1.1058	1.1532	4.3369	4.4302	4.5262
15	1.0563	1.0981	1.1417	4.0025	4.0820	4.1636
16	1.0528	1.0916	1.1317	3.7148	3.7833	3.8535
17	1.0498	1.0858	1.1231	3.4644	3.5240	3.5850
18	1.0471	1.0807	1.1155	3.2441	3.2964	3.3498
19	1.0446	1.0762	1.1088	3.0486	3.0948	3.1419
20	1.0424	1.0722	1.1027	2.8738	2.9148	2.9566
21	1.0404	1.0685	1.0973	2.7163	2.7530	2.7903
22	1.0386	1.0652	1.0924	2.5736	2.6065	2.6400
23	1.0369	1.0621	1.0879	2.4436	2.4733	2.5035
24	1.0354	1.0593	1.0837	2.3246	2.3515	2.3788
25	1.0340	1.0567	1.0800	2.2151	2.2395	2.2643
26	1.0326	1.0543	1.0764	2.1140	2.1363	2.1588
27	1.0314	1.0521	1.0732	2.0203	2.0406	2.0612
28	1.0302	1.0500	1.0701	1.9331	1.9517	1.9706
29	1.0291	1.0480	1.0673	1.8518	1.8689	1.8861
30	1.0280	1.0462	1.0646	1.7757	1.7913	1.8072
31	1.0270	1.0444	1.0621	1.7048	1.7187	1.7333
32	1.0261	1.0428	1.0598	1.6369	1.6503	1.6638
33	1.0252	1.0412	1.0575	1.5735	1.5858	1.5983
34	1.0243	1.0398	1.0554	1.5135	1.5249	1.5365
35	1.0235	1.0384	1.0534	1.4567	1.4673	1.4780
36	1.0227	1.0370	1.0515	1.4027	1.4125	1.4225
37	1.0220	1.0357	1.0497	1.3514	1.3605	1.3697
38	1.0213	1.0345	1.0479	1.3028	1.3109	1.3195
39	1.0206	1.0334	1.0463	1.2558	1.2636	1.2716
40	1.0199	1.0322	1.0447	1.2111	1.2184	1.2258
41	1.0193	1.0312	1.0432	1.1683	1.1751	1.1820
42	1.0187	1.0301	1.0417	1.1273	1.1336	1.1400
43	1.0181	1.0291	1.0403	1.0879	1.0938	1.0997
44	1.0175	1.0281	1.0389	1.0499	1.0554	1.0610
45	1.0169	1.0272	1.0376	1.0134	1.0185	1.0237
46	1.0164	1.0263	1.0363	.9781	.9829	.9877
47	1.0159	1.0254	1.0351	.9441	.9485	.9530
48	1.0154	1.0246	1.0339	.9111	.9153	.9195
49	1.0149	1.0237	1.0327	.8793	.8831	.8870
50	1.0144	1.0229	1.0316	.8484	.8520	.8556
51	1.0139	1.0222	1.0305	.8184	.8217	.8251
52	1.0134	1.0214	1.0294	.7893	.7924	.7955
53	1.0130	1.0207	1.0284	.7610	.7639	.7668
54	1.0125	1.0199	1.0274	.7334	.7361	.7388

$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
6	13.9649	15.0525	16.2475	3.7443	3.9144	4.0986
7	9.9622	10.5397	11.1592	3.2931	3.4058	3.5254
8	7.8767	8.2509	8.6471	3.0201	3.1063	3.1967
9	6.5325	6.7983	7.0774	2.8199	2.8900	2.9630
10	5.5745	5.7741	5.9824	2.6600	2.7191	2.7803
11	4.8498	5.0053	5.1669	2.5260	2.5769	2.6295
12	4.2791	4.4036	4.5324	2.4101	2.4547	2.5006
13	3.8162	3.9180	4.0230	2.3076	2.3472	2.3878
14	3.4325	3.5170	3.6040	2.2156	2.2510	2.2874
15	3.1086	3.1798	3.2529	2.1319	2.1639	2.1966
16	2.8314	2.8920	2.9541	2.0551	2.0841	2.1139
17	2.5913	2.6434	2.6966	1.9840	2.0105	2.0376
18	2.3812	2.4263	2.4723	1.9179	1.9421	1.9670
19	2.1958	2.2351	2.2752	1.8558	1.8782	1.9010
20	2.0310	2.0654	2.1005	1.7975	1.8182	1.8392
21	1.8835	1.9138	1.9447	1.7423	1.7615	1.7810
22	1.7507	1.7776	1.8049	1.6901	1.7079	1.7259
23	1.6306	1.6545	1.6787	1.6403	1.6569	1.6737
24	1.5215	1.5427	1.5643	1.5929	1.6083	1.6240
25	1.4218	1.4409	1.4602	1.5475	1.5619	1.5765
26	1.3306	1.3477	1.3650	1.5040	1.5175	1.5311
27	1.2467	1.2621	1.2776	1.4622	1.4748	1.4876
28	1.1694	1.1832	1.1972	1.4219	1.4338	1.4457
29	1.0979	1.1104	1.1230	1.3831	1.3942	1.4055
30	1.0316	1.0429	1.0543	1.3456	1.3561	1.3666
31	.9701	.9803	.9906	1.3094	1.3192	1.3291
32	.9127	.9220	.9314	1.2742	1.2835	1.2928
33	.8592	.8676	.8761	1.2402	1.2488	1.2576
34	.8092	.8168	.8246	1.2071	1.2152	1.2235
35	.7624	.7693	.7763	1.1749	1.1826	1.1903
36	.7184	.7248	.7311	1.1435	1.1508	1.1581
37	.6772	.6829	.6887	1.1130	1.1198	1.1267
38	.6384	.6436	.6489	1.0832	1.0897	1.0962
39	.6018	.6066	.6114	1.0542	1.0602	1.0663
40	.5673	.5717	.5761	1.0258	1.0315	1.0372
41	.5388	.5388	.5428	.9980	1.0034	1.0088
42	.5041	.5077	.5113	.9708	.9759	.9810
43	.4750	.4783	.4816	.9441	.9489	.9537
44	.4475	.4505	.4535	.9180	.9225	.9271
45	.4214	.4241	.4269	.8924	.8967	.9009
46	.3967	.3992	.4017	.8673	.8713	.8753
47	.3732	.3755	.3778	.8426	.8463	.8501
48	.3510	.3531	.3551	.8183	.8218	.8254
49	.3299	.3318	.3336	.7944	.7977	.8011
50	.3098	.3115	.3132	.7709	.7741	.7772
51	.2907	.2923	.2938	.7478	.7507	.7537
52	.2726	.2740	.2754	.7250	.7278	.7305
53	.2554	.2567	.2579	.7026	.7051	.7077
54	.2390	.2402	.2413	.6804	.6828	.6852

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H₁

$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
6	13.9649	15.0525	16.2475	3.7443	3.9144	4.0986
7	9.9622	10.5397	11.1592	3.2931	3.4058	3.5254
8	7.8767	8.2509	8.6471	3.0201	3.1063	3.1967
9	6.5325	6.7983	7.0774	2.8199	2.8900	2.9630
10	5.5745	5.7741	5.9824	2.6600	2.7191	2.7803
11	4.8498	5.0053	5.1669	2.5260	2.5769	2.6295
12	4.2791	4.4036	4.5324	2.4101	2.4547	2.5006
13	3.8162	3.9180	4.0230	2.3076	2.3472	2.3878
14	3.4325	3.5170	3.6040	2.2156	2.2510	2.2874
15	3.1086	3.1798	3.2529	2.1319	2.1639	2.1966
16	2.8314	2.8920	2.9541	2.0551	2.0841	2.1139
17	2.5913	2.6434	2.6966	1.9840	2.0105	2.0376
18	2.3812	2.4263	2.4723	1.9178	1.9421	1.9670
19	2.1958	2.2351	2.2752	1.8558	1.8782	1.9010
20	2.0310	2.0654	2.1005	1.7975	1.8182	1.8392
21	1.8835	1.9138	1.9447	1.7423	1.7615	1.7810
22	1.7507	1.7776	1.8049	1.6901	1.7079	1.7259
23	1.6306	1.6545	1.6787	1.6403	1.6569	1.6737
24	1.5215	1.5427	1.5643	1.5929	1.6083	1.6240
25	1.4218	1.4409	1.4602	1.5475	1.5619	1.5765
26	1.3306	1.3477	1.3650	1.5040	1.5175	1.5311
27	1.2467	1.2621	1.2776	1.4522	1.4748	1.4876
28	1.1694	1.1832	1.1972	1.4219	1.4338	1.4457
29	1.0979	1.1104	1.1230	1.3831	1.3942	1.4055
30	1.0316	1.0429	1.0543	1.3456	1.3561	1.3666
31	.9701	.9803	.9906	1.3094	1.3192	1.3291
32	.9127	.9220	.9314	1.2742	1.2835	1.2928
33	.8592	.8676	.8761	1.2402	1.2488	1.2576
34	.8092	.8168	.8246	1.2071	1.2152	1.2235
35	.7624	.7693	.7763	1.1749	1.1826	1.1903
36	.7184	.7248	.7311	1.1435	1.1508	1.1581
37	.6772	.6829	.6887	1.1130	1.1198	1.1267
38	.6384	.6436	.6489	1.0832	1.0897	1.0962
39	.6018	.6066	.6114	1.0542	1.0602	1.0663
40	.5673	.5717	.5761	1.0258	1.0315	1.0372
41	.5348	.5388	.5428	.9980	1.0034	1.0088
42	.5041	.5077	.5113	.9708	.9759	.9810
43	.4750	.4783	.4816	.9441	.9489	.9537
44	.4475	.4505	.4535	.9180	.9225	.9271
45	.4214	.4241	.4269	.8924	.8967	.9009
46	.3967	.3992	.4017	.8673	.8713	.8753
47	.3732	.3755	.3778	.8426	.8463	.8501
48	.3510	.3531	.3551	.8183	.8218	.8254
49	.3299	.3318	.3336	.7944	.7977	.8011
50	.3098	.3115	.3132	.7709	.7741	.7772
51	.2907	.2923	.2938	.7478	.7507	.7537
52	.2726	.2740	.2754	.7250	.7278	.7305
53	.2554	.2567	.2579	.7026	.7051	.7077
54	.2390	.2402	.2413	.6804	.6828	.6852

$\phi°$	τ			g		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
55	1.0121	1.0192	1.0264	.7066	.7091	.7116
56	1.0117	1.0185	1.0254	.6804	.6827	.6851
57	1.0112	1.0178	1.0245	.6549	.6570	.6592
58	1.0108	1.0172	1.0236	.62 9	.6319	.6339
59	1.0104	1.0165	1.0327	.60 5	.6074	.6092
60	1.0100	1.0159	1.0218	.5817	.5833	.5850
61	1.0096	1.0153	1.0209	.5583	.5598	.5614
62	1.0093	1.0147	1.0201	.5353	.5368	.5382
63	1.0089	1.0141	1.0192	.5129	.5142	.5155
64	1.0085	1.0135	1.0184	.4908	.4920	.4932
65	1.0081	1.0129	1.0176	.4691	.4702	.4713
66	1.0078	1.0123	1.0168	.4478	.4488	.4498
67	1.0074	1.0117	1.0160	.4268	.4277	.4286
68	1.0071	1.0112	1.0153	.4061	.4069	.4078
69	1.0067	1.0106	1.0145	.3857	.3865	.3872
70	1.0064	1.0101	1.0137	.3657	.3663	.3670
71	1.0060	1.0095	1.0130	.3458	.3464	.3470
72	1.0057	1.0090	1.0123	.3263	.3268	.3273
73	1.0054	1.0085	1.0115	.3069	.3074	.3079
74	1.0050	1.0079	1.0108	.2878	.2882	.2886
75	1.0047	1.0074	1.0101	.2689	.2692	.2696
76	1.0044	1.0069	1.0094	.2501	.2504	.2507
77	1.0041	1.0064	1.0087	.2315	.2318	.2321
78	1.0037	1.0059	1.0080	.2131	.2134	.2136
79	1.0034	1.0054	1.0073	.1949	.1950	.1952
80	1.0031	1.0049	1.0067	.1767	.1769	.1770
81	1.0028	1.0044	1.0060	.1587	.1588	.1590
82	1.0025	1.0039	1.0053	.1408	.1409	.1410
83	1.0022	1.0034	1.0046	.1230	.1231	.1231
84	1.0019	1.0029	1.0040	.1052	.1053	.1054
85	1.0015	1.0024	1.0033	.0876	.0876	.0877
86	1.0012	1.0019	1.0026	.0700	.0700	.0700
87	1.0009	1.0014	1.0020	.0524	.0525	.0525
88	1.0006	1.0010	1.0013	.0349	.0349	.0349
89	1.0003	1.0005	1.0007	.0175	.0175	.0175
90	1.0000	1.0000	1.0000	.0000	.0000	.0000

$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
55	.2234	.2245	.2255	.6586	.6608	.6631
56	.2086	.2095	.2105	.6370	.6391	.6412
57	.1945	.1953	.1962	.6157	.6177	.6196
58	.1811	.1818	.1826	.5947	.5965	.5983
59	.1683	.1690	.1697	.5739	.5756	.5773
60	.1562	.1568	.1574	.5533	.5549	.5564
61	.1447	.1452	.1458	.5329	.5344	.5359
62	.1338	.1342	.1347	.5128	.5142	.5155
63	.1234	.1238	.1242	.4929	.4941	.4953
64	.1135	.1139	.1143	.4731	.4742	.4754
65	.1042	.1045	.1048	.4535	.4546	.4556
66	.0954	.0956	.0959	.4341	.4351	.4360
67	.0870	.0872	.0875	.4149	.4157	.4166
68	.0791	.0793	.0795	.3958	.3966	.3974
69	.0716	.0718	.0720	.3768	.3775	.3783
70	.0646	.0647	.0649	.3580	.3587	.3593
71	.0580	.0581	.0582	.3393	.3399	.3405
72	.0518	.0519	.0520	.3208	.3213	.3218
73	.0459	.0460	.0461	.3023	.3028	.3032
74	.0405	.0406	.0407	.2840	.2844	.2848
75	.0354	.0355	.0356	.2657	.2661	.2664
76	.0307	.0308	.0308	.2476	.2479	.2482
77	.0264	.0265	.0265	.2295	.2298	.2301
78	.0224	.0225	.0225	.2116	.2118	.2120
79	.0188	.0188	.0188	.1936	.1938	.1940
80	.0155	.0155	.0155	.1758	.1760	.1761
81	.0125	.0125	.0125	.1580	.1582	.1583
82	.0099	.0099	.0099	.1403	.1404	.1405
83	.0075	.0075	.0075	.1227	.1227	.1228
84	.0055	.0055	.0055	.1050	.1051	.1052
85	.0038	.0038	.0038	.0875	.0875	.0876
86	.0024	.0024	.0024	.0699	.0700	.0700
87	.0014	.0014	.0014	.0524	.0524	.0524
88	.0006	.0006	.0006	.0349	.0349	.0349
89	.0002	.0002	.0002	.0175	.0175	.0175
90	.0000	.0000	.0000	.0000	.0000	.0000

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$\phi°$	τ			σ		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
11	1.2033	1.3126	1.4317	9.6870	10.1330	10.6061
12	1.1677	1.2502	1.3385	7.4730	7.7403	8.0202
13	1.1476	1.2159	1.2882	6.2630	6.4515	6.6476
14	1.1337	1.1926	1.2546	5.4513	5.5946	5.7429
15	1.1231	1.1753	1.2298	4.8523	4.9662	5.0835
16	1.1146	1.1615	1.2103	4.3848	4.4779	4.5737
17	1.1076	1.1502	1.1945	4.0059	4.0838	4.1636
18	1.1015	1.1406	1.1812	3.6904	3.7566	3.8244
19	1.0962	1.1324	1.1698	3.4223	3.4793	3.5376
20	1.0915	1.1252	1.1599	3.1907	3.2404	3.2910
21	1.0873	1.1188	1.1511	2.9881	3.0317	3.0762
22	1.0835	1.1130	1.1433	2.8090	2.8475	2.8868
23	1.0801	1.1078	1.1363	2.6491	2.6834	2.7183
24	1.0769	1.1031	1.1299	2.5052	2.5359	2.5671
25	1.0739	1.0987	1.1241	2.3749	2.4025	2.4306
26	1.0712	1.0947	1.1187	2.2561	2.2811	2.3064
27	1.0686	1.0909	1.1138	2.1473	2.1699	2.1929
28	1.0662	1.0874	1.1092	2.0471	2.0677	2.0886
29	1.0639	1.0842	1.1049	1.9545	1.9733	1.9923
30	1.0617	1.0811	1.1008	1.8685	1.8857	1.9031
31	1.0597	1.0782	1.0971	1.7884	1.8042	1.8201
32	1.0577	1.0755	1.0935	1.7136	1.7280	1.7426
33	1.0559	1.0729	1.0901	1.6434	1.6567	1.6701
34	1.0541	1.0704	1.0869	1.5774	1.5897	1.6020
35	1.0524	1.0680	1.0839	1.5152	1.5265	1.5379
36	1.0508	1.0658	1.0810	1.4564	1.4669	1.4774
37	1.0492	1.0636	1.0782	1.4007	1.4104	1.4202
38	1.0477	1.0616	1.0756	1.3479	1.3568	1.3659
39	1.0462	1.0596	1.0731	1.2976	1.3059	1.3143
40	1.0448	1.0577	1.0706	1.2497	1.2574	1.2652
41	1.0435	1.0558	1.0683	1.2040	1.2111	1.2184
42	1.0421	1.0540	1.0661	1.1602	1.1669	1.1736
43	1.0408	1.0523	1.0639	1.1183	1.1245	1.1307
44	1.0396	1.0506	1.0518	1.0781	1.0839	1.0897
45	1.0384	1.0490	1.0598	1.0395	1.0448	1.0502
46	1.0372	1.0474	1.0578	1.0023	1.0073	1.0123
47	1.0360	1.0459	1.0559	.9665	.9711	.9756
48	1.0349	1.0444	1.0540	.9319	.9362	.9405
49	1.0338	1.0430	1.0522	.8985	.9025	.9065
50	1.0327	1.0416	1.0505	.8662	.8699	.8737
51	1.0317	1.0402	1.0488	.8349	.8384	.8419
52	1.0307	1.0389	1.0471	.8046	.8078	.8110
53	1.0296	1.0375	1.0455	.7752	.7781	.7811
54	1.0287	1.0363	1.0439	.7466	.7493	.7521
55	1.0277	1.0350	1.0424	.7187	.7213	.7239
56	1.0267	1.0338	1.0408	.6916	.6940	.6964
57	1.0258	1.0326	1.0394	.6652	.6674	.6697
58	1.0249	1.0314	1.0379	.6395	.6415	.6436
59	1.0240	1.0302	1.0365	.6143	.6162	.6181

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$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
11	8.6125	9.0405	9.4950	3.4757	3.5891	3.7085
12	6.4425	6.6954	6.9604	3.0367	3.1147	3.1959
13	5.2610	5.4370	5.6202	2.7756	2.8366	2.8998
14	4.4716	4.6036	4.7404	2.5865	2.6370	2.6891
15	3.8917	3.9952	4.1020	2.4368	2.4799	2.5242
16	3.4411	3.5247	3.6107	2.3120	2.3496	2.3882
17	3.0778	3.1467	3.2174	2.2045	2.2378	2.2718
18	2.7768	2.8346	2.8938	2.1097	2.1395	2.1699
19	2.5226	2.5716	2.6218	2.0247	2.0515	2.0789
20	2.3043	2.3464	2.3894	1.9474	1.9718	1.9967
21	2.1146	2.1510	2.1882	1.8765	1.8988	1.9215
22	1.9478	1.9796	2.0120	1.8109	1.8313	1.8521
23	1.8001	1.8279	1.8563	1.7497	1.7685	1.7877
24	1.6682	1.6927	1.7177	1.6924	1.7098	1.7274
25	1.5496	1.5713	1.5934	1.6383	1.6545	1.6708
26	1.4424	1.4617	1.4813	1.5872	1.6022	1.6174
27	1.3450	1.3622	1.3797	1.5387	1.5526	1.5667
28	1.2561	1.2715	1.2872	1.4925	1.5054	1.5186
29	1.1747	1.1885	1.2026	1.4483	1.4604	1.4726
30	1.0999	1.1123	1.1249	1.4059	1.4173	1.4287
31	1.0309	1.0421	1.0534	1.3653	1.3759	1.3866
32	.9670	.9772	.9874	1.3262	1.3361	1.3461
33	.9078	.9170	.9262	1.2885	1.2978	1.3072
34	.8528	.8611	.8694	1.2521	1.2608	1.2696
35	.8015	.8090	.8166	1.2168	1.2250	1.2333
36	.7537	.7605	.7673	1.1827	1.1904	1.1982
37	.7089	.7151	.7213	1.1496	1.1568	1.1641
38	.6670	.6726	.6782	1.1174	1.1242	1.1311
39	.6276	.6327	.6379	1.0861	1.0925	1.0990
40	.5907	.5953	.6000	1.0557	1.0617	1.0677
41	.5559	.5601	.5644	1.0259	1.0316	1.0373
42	.5231	.5270	.5308	.9970	1.0023	1.0077
43	.4922	.4957	.4992	.9687	.9737	.9787
44	.4631	.4662	.4694	.9410	.9457	.9504
45	.4355	.4384	.4413	.9139	.9183	.9228
46	.4095	.4121	.4147	.8874	.8916	.8957
47	.3848	.3872	.3896	.8614	.8653	.8692
48	.3614	.3636	.3658	.8359	.8396	.8433
49	.3393	.3413	.3432	.8109	.8144	.8178
50	.3183	.3201	.3219	.7864	.7896	.7928
51	.2984	.3000	.3017	.7622	.7652	.7683
52	.2796	.2810	.2825	.7385	.7413	.7442
53	.2616	.2629	.2643	.7151	.7178	.7204
54	.2446	.2458	.2470	.6921	.6946	.6971
55	.2285	.2295	.2306	.6695	.6718	.6741
56	.2131	.2141	.2150	.6472	.6493	.6515
57	.1985	.1994	.2003	.6251	.6272	.6292
58	.1847	.1855	.1863	.6034	.6053	.6072
59	.1716	.1723	.1729	.5820	.5837	.5854

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$\phi°$	τ			σ		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
60	1.0231	1.0290	1.0351	.5898	.5915	.5932
61	1.0222	1.0279	1.0337	.5657	.5673	.5689
62	1.0213	1.0268	1.0323	.5422	.5436	.5451
63	1.0205	1.0257	1.0310	.5191	.5205	.5218
64	1.0196	1.0246	1.0297	.4965	.4977	.4990
65	1.0188	1.0236	1.0284	.4743	.4754	.4766
66	1.0180	1.0225	1.0271	.4525	.4535	.4545
67	1.0171	1.0215	1.0259	.4311	.4320	.4329
68	1.0163	1.0205	1.0246	.4100	.4108	.4117
69	1.0155	1.0195	1.0234	.3892	.3900	.3908
70	1.0147	1.0185	1.0222	.3688	.3695	.3702
71	1.0140	1.0175	1.0210	.3486	.3492	.3499
72	1.0132	1.0165	1.0198	.3288	.3293	.3298
73	1.0124	1.0155	1.0187	.3091	.3096	.3101
74	1.0117	1.0146	1.0175	.2897	.2901	.2906
75	1.0109	1.0136	1.0163	.2705	.2709	.2713
76	1.0101	1.0127	1.0152	.2516	.2519	.2522
77	1.0094	1.0117	1.0141	.2328	.2331	.2333
78	1.0087	1.0108	1.0130	.2142	.2144	.2146
79	1.0079	1.0099	1.0119	.1957	.1959	.1961
80	1.0072	1.0090	1.0107	.1774	.1776	.1778
81	1.0064	1.0080	1.0097	.1593	.1594	.1595
82	1.0057	1.0071	1.0086	.1413	.1414	.1414
83	1.0050	1.0062	1.0075	.1233	.1234	.1235
84	1.0043	1.0053	1.0064	.1055	.1056	.1056
85	1.0036	1.0044	1.0053	.0878	.0878	.0878
86	1.0028	1.0035	1.0043	.0701	.0701	.0702
87	1.0021	1.0027	1.0032	.0525	.0525	.0525
88	1.0014	1.0018	1.0021	.0350	.0350	.0350
89	1.0007	1.0009	1.0011	.0175	.0175	.0175
90	1.0000	1.0000	1.0000	.0000	.0000	.0000

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Table 1

$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
60	.1591	.1597	.1603	.5608	.5624	.5640
61	.1473	.1478	.1483	.5399	.5414	.5429
62	.1360	.1365	.1370	.5192	.5206	.5219
63	.1254	.1258	.1262	.4987	.5000	.5013
64	.1153	.1157	.1160	.4785	.4797	.4808
65	.1057	.1061	.1064	.4585	.4595	.4606
66	.0967	.0970	.0973	.4386	.4396	.4406
67	.0881	.0884	.0886	.4190	.4199	.4208
68	.0801	.0803	.0805	.3995	.4003	.4011
69	.0725	.0727	.0728	.3802	.3809	.3817
70	.0653	.0655	.0656	.3611	.3617	.3624
71	.0586	.0587	.0588	.3421	.3426	.3432
72	.0523	.0524	.0525	.3232	.3237	.3242
73	.0464	.0465	.0466	.3045	.3049	.3054
74	.0409	.0409	.0410	.2859	.2863	.2867
75	.0357	.0358	.0359	.2674	.26.7	.2681
76	.0310	.0310	.0311	.2490	.2493	.2496
77	.0266	.0266	.0267	.2308	.2310	.2313
78	.0226	.0226	.0226	.2126	.2128	.2130
79	.0189	.0189	.0189	.1945	.1947	.1949
80	.0156	.0156	.0156	.1765	.1767	.1768
81	.0126	.0126	.0126	.1586	.1588	.1589
82	.0099	.0099	.0099	.1408	.1409	.1410
83	.0076	.0076	.0076	.1230	.1231	.1232
84	.0055	.0055	.0055	.1053	.1054	.1054
85	.0038	.0038	.0038	.0877	.0877	.0877
86	.0025	.0025	.0025	.0700	.0701	.0701
87	.0014	.0014	.0014	.0525	.0525	.0525
88	.0006	.0006	.0006	.0350	.0350	.0350
89	.0002	.0002	.0002	.0175	.0175	.0175
90	.0000	.0000	.0000	.0000	.0000	.0000

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$\phi°$	τ			σ		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
16	1.3135	1.4019	1.4963	7.6734	7.9397	8.2181
17	1.2645	1.3325	1.4040	6.0198	6.1860	6.3582
18	1.2364	1.2934	1.3529	5.1078	5.2285	5.3529
19	1.2167	1.2663	1.3180	4.4900	4.5839	4.6803
20	1.2014	1.2457	1.2916	4.0296	4.1057	4.1835
21	1.1890	1.2291	1.2705	3.6669	3.7301	3.7947
22	1.1785	1.2152	1.2530	3.3702	3.4238	3.4784
23	1.1694	1.2032	1.2380	3.1210	3.1671	3.2141
24	1.1614	1.1928	1.2250	2.9075	2.9476	2.9885
25	1.1542	1.1835	1.2135	2.7217	2.7569	2.7927
26	1.1476	1.1751	1.2032	2.5579	2.5891	2.6208
27	1.1417	1.1675	1.1939	2.4120	2.4397	2.4680
28	1.1362	1.1605	1.1854	2.2808	2.3057	2.3310
29	1.1310	1.1541	1.1776	2.1621	2.1845	2.2072
30	1.1263	1.1481	1.1704	2.0539	2.0741	2.0947
31	1.1218	1.1426	1.1637	1.9547	1.9730	1.9917
32	1.1176	1.1373	1.1574	1.8633	1.8800	1.8969
33	1.1136	1.1324	1.1515	1.7786	1.7939	1.8093
34	1.1098	1.1277	1.1460	1.7000	1.7140	1.7281
35	1.1062	1.1233	1.1407	1.6266	1.6394	1.6524
36	1.1027	1.1191	1.1358	1.5580	1.5697	1.5816
37	1.0994	1.1151	1.1310	1.4935	1.5043	1.5152
38	1.0962	1.1113	1.1265	1.4327	1.4427	1.4528
39	1.0932	1.1076	1.1222	1.3754	1.3846	1.3939
40	1.0902	1.1041	1.1181	1.3211	1.3296	1.3382
41	1.0874	1.1007	1.1141	1.2696	1.2775	1.2854
42	1.0847	1.0974	1.1103	1.2206	1.2279	1.2352
43	1.0820	1.0943	1.1067	1.1740	1.1807	1.1875
44	1.0794	1.0912	1.1031	1.1294	1.1357	1.1419
45	1.0769	1.0983	1.0997	1.0868	1.0926	1.0984
46	1.0745	1.0854	1.0964	1.0460	1.0514	1.0568
47	1.0722	1.0826	1.0932	1.0069	1.0118	1.0168
48	1.0699	1.0799	1.0901	.9692	.9738	.9785
49	1.0676	1.0773	1.0870	.9330	.9373	.9416
50	1.0654	1.0747	1.0841	.8981	.9020	.9060
51	1.0633	1.0722	1.0812	.8644	.8680	.8717
52	1.0612	1.0698	1.0784	.8318	.8352	.8386
53	1.0591	1.0674	1.0757	.8003	.8034	.8066
54	1.0571	1.0651	1.0731	.7698	.7727	.7756
55	1.0552	1.0628	1.0705	.7402	.7428	.7456
56	1.0532	1.0606	1.0679	.7114	.7139	.7164
57	1.0513	1.0584	1.0654	.6835	.6857	.6881
58	1.0495	1.0562	1.0630	.6563	.6584	.6605
59	1.0476	1.0541	1.0606	.6298	.6317	.6337
60	1.0458	1.0520	1.0583	.6039	.6057	.6075
61	1.0441	1.0500	1.0560	.5787	.5804	.5820
62	1.0423	1.0480	1.0537	.5541	.5556	.5571
63	1.0406	1.0460	1.0515	.5300	.5314	.5328
64	1.0389	1.0441	1.0493	.5064	.5077	.5090

$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
16	6.5182	6.7658	7.0250	3.4145	3.5062	3.6016
17	4.9322	5.0838	5.2411	2.9466	3.0100	3.0754
18	4.0622	4.1705	4.2822	2.6730	2.7227	2.7738
19	3.4763	3.5591	3.6442	2.4772	2.5184	2.5607
20	3.0422	3.1082	3.1758	2.3237	2.3590	2.3950
21	2.7024	2.7564	2.8116	2.1968	2.2275	2.2590
22	2.4264	2.4713	2.5173	2.0881	2.1154	2.1431
23	2.1961	2.2342	2.2731	1.9928	2.0172	2.0420
24	2.0003	2.0329	2.0661	1.9077	1.9297	1.9521
25	1.8312	1.8594	1.8881	1.8307	1.8507	1.8710
26	1.6833	1.7079	1.7328	1.7602	1.7784	1.7970
27	1.5537	1.5742	1.5961	1.6951	1.7118	1.7288
28	1.4364	1.4553	1.4746	1.6346	1.6500	1.6656
29	1.3321	1.3488	1.3658	1.5779	1.5921	1.6066
30	1.2379	1.2527	1.2678	1.5247	1.5378	1.5512
31	1.1524	1.1656	1.1790	1.4743	1.4865	1.4989
32	1.0744	1.0863	1.0983	1.4266	1.4379	1.4494
33	1.0031	1.0137	1.0244	1.3811	1.3917	1.4023
34	.9375	.9470	.9566	1.3377	1.3475	1.3575
35	.8770	.8856	.8942	1.2962	1.3053	1.3146
36	.8211	.8288	.8366	1.2563	1.2649	1.2735
37	.7693	.7762	.7832	1.2179	1.2259	1.2340
38	.7211	.7274	.7337	1.1810	1.1885	1.1960
39	.6762	.6819	.6876	1.1453	1.1523	1.1594
40	.6343	.6394	.6446	1.1107	1.1173	1.1240
41	.5951	.5998	.6045	1.0773	1.0835	1.0897
42	.5585	.5627	.5669	1.0449	1.0506	1.0564
43	.5241	.5279	.5317	1.0133	1.0187	1.0242
44	.4918	.4952	.4987	.9827	.9877	.9928
45	.4614	.4645	.4676	.9528	.9576	.9623
46	.4328	.4356	.4384	.9237	.9282	.9326
47	.4058	.4084	.4109	.8953	.8995	.9037
48	.3804	.3827	.3850	.8676	.8715	.8754
49	.3564	.3585	.3606	.8404	.8441	.8478
50	.3337	.3356	.3375	.8139	.8173	.8207
51	.3123	.3140	.3157	.7879	.7911	.7943
52	.2920	.2935	.2951	.7624	.7654	.7684
53	.2728	.2742	.2756	.7374	.7402	.7430
54	.2546	.2559	.2571	.7128	.7154	.7181
55	.2374	.2386	.2397	.6887	.6912	.6936
56	.2211	.2222	.2232	.6650	.6673	.6696
57	.2057	.2066	.2075	.6417	.6438	.6459
58	.1911	.1919	.1927	.6188	.6207	.6227
59	.1773	.1780	.1787	.5962	.5980	.5998
60	.1641	.1648	.1654	.5739	.5756	.5773
61	.1517	.1523	.1529	.5520	.5535	.5551
62	.1400	.1405	.1410	.5304	.5318	.5332
63	.1289	.1293	.1297	.5090	.5103	.5116
64	.1183	.1187	.1191	.4879	.4891	.4903

$\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
65	1.0372	1.0422	1.0471	.4833	.4845	.4857
66	1.0356	1.0403	1.0450	.4607	.4618	.4628
67	1.0339	1.0384	1.0429	.4385	.4394	.4404
68	1.0323	1.0366	1.0408	.4167	.4176	.4184
69	1.0307	1.0347	1.0388	.3953	.3960	.3968
70	1.0291	1.0329	1.0368	.3742	.3749	.3756
71	1.0276	1.0312	1.0348	.3535	.3541	.3547
72	1.0260	1.0294	1.0328	.3330	.3336	.3341
73	1.0245	1.0277	1.0309	.3129	.3134	.3139
74	1.0230	1.0259	1.0289	.2930	.2935	.2939
75	1.0215	1.0242	1.0270	.2734	.2738	.2742
76	1.0200	1.0225	1.0251	.2541	.2544	.2547
77	1.0185	1.0209	1.0233	.2349	.2352	.2355
78	1.0170	1.0192	1.0214	.2160	.2162	.2165
79	1.0156	1.0176	1.0195	.1972	.1974	.1976
80	1.0141	1.0159	1.0177	.1787	.1788	.1790
81	1.0127	1.0143	1.0159	.1603	.1604	.1605
82	1.0112	1.0127	1.0141	.1420	.1421	.1422
83	1.0098	1.0111	1.0123	.1239	.1240	.1241
84	1.0084	1.0095	1.0105	.1059	.1050	.1060
85	1.0070	1.0079	1.0087	.0881	.0881	.0881
86	1.0056	1.0063	1.0070	.0703	.0703	.0703
87	1.0042	1.0047	1.0052	.0526	.0526	.0526
88	1.0028	1.0031	1.0035	.0350	.0350	.0350
89	1.0014	1.0016	1.0017	.0175	.0175	.0175
90	1.0000	1.0000	1.0000	.0000	.0000	.0000

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$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
65	.1084	.1087	.1091	.4671	.4682	.4693
66	.0990	.0993	.0996	.4465	.4475	.4485
67	.0902	.0904	.0907	.4261	.4270	.4279
68	.0818	.0820	.0823	.4060	.4068	.4076
69	.0740	.0741	.0743	.3860	.3868	.3975
70	.0666	.0667	.0669	.3663	.3670	.3676
71	.0597	.0598	.0599	.3467	.3473	.3479
72	.0532	.0533	.0534	.3274	.3279	.3284
73	.0471	.0472	.0473	.3082	.3086	.3091
74	.0415	.0416	.0416	.2891	.2895	.2900
75	.0362	.0363	.0364	.2702	.2706	.2710
76	.0314	.0314	.0315	.2515	.2518	.2521
77	.0269	.0270	.0270	.2329	.2331	.2334
78	.0238	.0239	.0229	.2144	.2146	.2148
79	.0191	.0191	.0191	.1960	.1962	.1964
80	.0157	.0157	.0157	.1779	.1779	.1781
81	.0127	.0127	.0127	.1596	.1597	.1599
82	.0100	.0100	.0100	.1416	.1417	.1418
83	.0076	.0076	.0076	.1236	.1237	.1238
84	.0056	.0056	.0056	.1057	.1058	.1059
85	.0039	.0039	.0039	.0880	.0880	.0880
86	.0025	.0025	.0025	.0702	.0703	.0703
87	.0014	.0014	.0014	.0526	.0526	.0526
88	.0006	.0006	.0006	.0350	.0350	.0350
89	.0002	.0002	.0002	.0175	.0175	.0175
90	.0000	.0000	.0000	.0000	.0000	.0000

	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$

$$\phi_c = 20°$$

$\phi°$	τ			σ		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
21	1.4985	1.5794	1.6646	6.6957	6.8861	7.0835
22	1.4190	1.4810	1.5457	5.2632	5.3836	5.5076
23	1.3738	1.4257	1.4796	4.4768	4.5652	4.6558
24	1.3421	1.3873	1.4342	3.9443	4.0137	4.0845
25	1.3176	1.3580	1.3996	3.5471	3.6036	3.6613
26	1.2977	1.3342	1.3719	3.2334	3.2807	3.3289
27	1.2808	1.3143	1.3487	2.9762	3.0165	3.0575
28	1.2662	1.2971	1.3287	2.7596	2.7945	2.8298
29	1.2533	1.2820	1.3113	2.5735	2.6039	2.6348
30	1.2417	1.2685	1.2958	2.4110	2.4378	2.4650
31	1.2312	1.2563	1.2819	2.2673	2.2911	2.3152
32	1.2216	1.2451	1.2692	2.1389	2.1602	2.1817
33	1.2127	1.2349	1.2575	2.0232	2.0423	2.0616
34	1.2044	1.2254	1.2468	1.9181	1.9353	1.9527
35	1.1967	1.2166	1.2368	1.8221	1.8376	1.8534
36	1.1894	1.2083	1.2275	1.7338	1.7479	1.7622
37	1.1825	1.2005	1.2187	1.6522	1.6650	1.6780
38	1.1760	1.1931	1.2105	1.5764	1.5881	1.6000
39	1.1699	1.1861	1.2027	1.5058	1.5165	1.5274
40	1.1640	1.1795	1.1953	1.4398	1.4496	1.4595
41	1.1583	1.1732	1.1882	1.3778	1.3868	1.3959
42	1.1530	1.1671	1.1815	1.3195	1.3278	1.3361
43	1.1478	1.1613	1.1750	1.2644	1.2720	1.2797
44	1.1428	1.1558	1.1689	1.2123	1.2193	1.2264
45	1.1380	1.1504	1.1629	1.1628	1.1693	1.1758
46	1.1333	1.1452	1.1572	1.1158	1.1218	1.1278
47	1.1288	1.1402	1.1517	1.0710	1.0765	1.0820
48	1.1245	1.1354	1.1464	1.0282	1.0332	1.0383
49	1.1202	1.1307	1.1413	.9872	.9919	.9966
50	1.1161	1.1262	1.1363	.9480	.9523	.9566
51	1.1121	1.1218	1.1315	.9103	.9143	.9183
52	1.1083	1.1175	1.1268	.8741	.8778	.8815
53	1.1045	1.1133	1.1222	.8392	.8426	.8460
54	1.1008	1.1092	1.1178	.8055	.8087	.8118
55	1.0971	1.1053	1.1134	.7731	.7760	.7789
56	1.0936	1.1014	1.1092	.7417	.7443	.7470
57	1.0901	1.0976	1.1051	.7112	.7137	.7162
58	1.0868	1.0939	1.1010	.6818	.6840	.6863
59	1.0834	1.0902	1.0971	.6531	.6552	.6573
60	1.0802	1.0867	1.0932	.6253	.6273	.6292
61	1.0770	1.0832	1.0894	.5983	.6001	.6018
62	1.0738	1.0798	1.0857	.5720	.5736	.5752
63	1.0707	1.0764	1.0821	.5463	.5478	.5492
64	1.0677	1.0731	1.0785	.5213	.5226	.5239
65	1.0647	1.0698	1.0750	.4968	.4980	.4992
66	1.0618	1.0666	1.0715	.4729	.4740	.4751
67	1.0589	1.0635	1.0681	.4495	.4505	.4515
68	1.0560	1.0604	1.0648	.4266	.4275	.4284
69	1.0532	1.0573	1.0615	.4042	.4050	.4058

$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
21	5.4299	5.6003	5.7772	3.4669	3.5481	3.6321
22	4.0965	4.2018	4.3103	2.9434	2.9990	3.0562
23	3.3698	3.4455	3.5231	2.6430	2.6864	2.7308
24	2.8814	2.9396	2.9992	2.4309	2.4667	2.5033
25	2.5199	2.5664	2.6140	2.2663	2.2968	2.3279
26	2.2367	2.2749	2.3139	2.1313	2.1579	2.1849
27	2.0065	2.0385	2.0710	2.0166	2.0401	2.0639
28	1.8144	1.8415	1.8691	1.9167	1.9376	1.9588
29	1.6508	1.6740	1.6976	1.8279	1.8467	1.8658
30	1.5093	1.5294	1.5498	1.7479	1.7649	1.7822
31	1.3855	1.4030	1.4208	1.6750	1.6905	1.7062
32	1.2761	1.2914	1.3069	1.6079	1.6221	1.6365
33	1.1785	1.1920	1.2056	1.5458	1.5588	1.5719
34	1.0908	1.1028	1.1148	1.4878	1.4998	1.5119
35	1.0116	1.0222	1.0329	1.4334	1.4444	1.4556
36	.9397	.9492	.9587	1.3821	1.3923	1.4026
37	.8741	.8825	.8910	1.3336	1.3430	1.3526
38	.8140	.8215	.8291	1.2875	1.2962	1.3051
39	.7588	.7655	.7723	1.2435	1.2517	1.2599
40	.7078	.7139	.7199	1.2015	1.2091	1.2168
41	.6607	.6661	.6716	1.1613	1.1683	1.1755
42	.6170	.6219	.6268	1.1227	1.1292	1.1358
43	.5764	.5808	.5852	1.0855	1.0916	1.0977
44	.5386	.5425	.5465	1.0496	1.0553	1.0610
45	.5033	.5069	.5104	1.0149	1.0202	1.0256
46	.4703	.4735	.4767	.9814	.9863	.9913
47	.4395	.4424	.4452	.9489	.9535	.9581
48	.4106	.4132	.4157	.9173	.9216	.9259
49	.3834	.3858	.3881	.8866	.8906	.8947
50	.3579	.3600	.3621	.8568	.8605	.8643
51	.3340	.3359	.3377	.8277	.8312	.8347
52	.3114	.3131	.3148	.7994	.8026	.8059
53	.2902	.2917	.2932	.7717	.7747	.7778
54	.2702	.2715	.2729	.7447	.7475	.7503
55	.2513	.2525	.2538	.7182	.7208	.7234
56	.2335	.2346	.2357	.6923	.6947	.6972
57	.2167	.2177	.2187	.6670	.6692	.6715
58	.2009	.2018	.2026	.6421	.6442	.6463
59	.1859	.1867	.1875	.6177	.6196	.6216
60	.1718	.1725	.1732	.5938	.5955	.5973
61	.1585	.1591	.1597	.5702	.5719	.5735
62	.1460	.1465	.1470	.5471	.5486	.5501
63	.1341	.1346	.1350	.5243	.5257	.5271
64	.1229	.1233	.1237	.5019	.5032	.5045
65	.1124	.1128	.1131	.4799	.4810	.4822
66	.1025	.1028	.1031	.4581	.4592	.4602
67	.0932	.0934	.0937	.4367	.4376	.4386
68	.0844	.0846	.0849	.4155	.4164	.4172
69	.0762	.0764	.0766	.3946	.3954	.3962

$\phi_c = 20°$ (continued)

$\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
70	1.0504	1.0543	1.0582	.3822	.3829	.3836
71	1.0476	1.0513	1.0550	.3606	.3612	.3618
72	1.0449	1.0484	1.0519	.3393	.3399	.3404
73	1.0422	1.0455	1.0487	.3184	.3189	.3194
74	1.0396	1.0426	1.0457	.2979	.2983	.2988
75	1.0369	1.0398	1.0426	.2776	.2780	.2784
76	1.0343	1.0369	1.0396	.2577	.2580	.2583
77	1.0317	1.0342	1.0366	.2380	.2383	.2386
78	1.0292	1.0314	1.0336	.2186	.2188	.2191
79	1.0267	1.0287	1.0307	.1994	.1996	.1998
80	1.0242	1.0260	1.0278	.1805	.1806	.1808
81	1.0217	1.0233	1.0249	.1617	.1618	.1620
82	1.0192	1.0206	1.0221	.1432	.1433	.1434
83	1.0167	1.0180	1.0193	.1248	.1248	.1249
84	1.0143	1.0154	1.0165	.1066	.1066	.1067
85	1.0119	1.0128	1.01.	.0885	.0885	.0886
86	1.0095	1.0102	1.0109	.0706	.0706	.0706
87	1.0071	1.0076	1.0082	.0528	.0528	.0528
88	1.0047	1.0051	1.0054	.0351	.0351	.0351
89	1.0024	1.0025	1.0027	.0175	.0175	.0175
90	1.0000	1.0000	1.0000	.0000	.0000	.0000

$\phi_c = 25°$

$\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
26	1.7728	1.8528	1.9365	6.2016	6.3531	6.5093
27	1.6396	1.7000	1.7626	4.8386	4.9342	5.0321
28	1.5651	1.6153	1.6671	4.1002	4.1703	4.2420
29	1.5135	1.5570	1.6017	3.6037	3.6587	3.7147
30	1.4740	1.5126	1.5522	3.2346	3.2795	3.3252
31	1.4420	1.4769	1.5125	2.9439	2.9815	3.0196
32	1.4152	1.4469	1.4794	2.7059	2.7379	2.7704
33	1.3919	1.4212	1.4510	2.5056	2.5332	2.5612
34	1.3715	1.3986	1.4261	2.3335	2.3576	2.3821
35	1.3532	1.3784	1.4040	2.1832	2.2044	2.2260
36	1.3367	1.3602	1.3841	2.0503	2.0691	2.0882
37	1.3216	1.3436	1.3661	1.9315	1.9483	1.9653
38	1.3077	1.3284	1.3495	1.8243	1.8394	1.8546
39	1.2947	1.3143	1.3341	1.7269	1.7405	1.7542

Table 1

$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
70	.0685	.0686	.0688	.3740	.3747	.3754
71	.0612	.0614	.0615	.3536	.3542	.3549
72	.0545	.0546	.0547	.3335	.3340	.3346
73	.0482	.0483	.0484	.3136	.3140	.3145
74	.0424	.0425	.0426	.2939	.2943	.2947
75	.0370	.0370	.0371	.2744	.2747	.2751
76	.0320	.0320	.0321	.2550	.2554	.2557
77	.0274	.0274	.0275	.2359	.2362	.2365
78	.0232	.0232	.0233	.2170	.2172	.2174
79	.0194	.0194	.0194	.1982	.1984	.1985
80	.0159	.0159	.0159	.1795	.1797	.1798
81	.0128	.0128	.0128	.1610	.1612	.1613
82	.0101	.0101	.0101	.1427	.1428	.1429
83	.0077	.0077	.0077	.1245	.1245	.1246
84	.0056	.0056	.0056	.1064	.1064	.1065
85	.0039	.0039	.0039	.0884	.0884	.0885
86	.0025	.0025	.0025	.0705	.0705	.0706
87	.0014	.0014	.0014	.0527	.0528	.0528
88	.0006	.0006	.0006	.0351	.0351	.0351
89	.0002	.0002	.0002	.0175	.0175	.0175
90	.0000	.0000	.0000	.0000	.0000	.0000

$\phi_c = 25°$

$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
26	4.7901	4.9197	5.0535	3.6067	3.6828	3.7611
27	3.5696	3.6492	3.7307	2.9999	3.0511	3.1035
28	2.9145	2.9714	3.0296	2.6594	2.6989	2.7392
29	2.4779	2.5216	2.5662	2.4227	2.4550	2.4878
30	2.1567	2.1915	2.2270	2.2411	2.2684	2.2961
31	1.9062	1.9347	1.9637	2.0936	2.1172	2.1411
32	1.7032	1.7270	1.7512	1.9693	1.9900	2.0109
33	1.5342	1.5543	1.5747	1.8617	1.8800	1.8986
34	1.3907	1.4079	1.4253	1.7668	1.7832	1.7998
35	1.2668	1.2816	1.2967	1.6817	1.6964	1.7114
36	1.1586	1.1715	1.1845	1.6045	1.6179	1.6314
37	1.0631	1.0743	1.0857	1.5339	1.5460	1.5583
38	.9781	.9879	.9979	1.4686	1.4797	1.4910
39	.9018	.9105	.9193	1.4080	1.4182	1.4284

$\phi_c = 25°$ (continued)

$\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
40	1.2827	1.3011	1.3199	1.6378	1.6501	1.6624
41	1.2714	1.2888	1.3066	1.5558	1.5669	1.5781
42	1.2607	1.2773	1.2940	1.4800	1.4901	1.5002
43	1.2506	1.2663	1.2883	1.4095	1.4187	1.4279
44	1.2411	1.2560	1.2711	1.3438	1.3521	1.3606
45	1.2319	1.2461	1.2605	1.2823	1.2899	1.2976
46	1.2232	1.2368	1.2504	1.2244	1.2314	1.2384
47	1.2149	1.2278	1.2403	1.1699	1.1763	1.1828
48	1.2069	1.2192	1.2316	1.1184	1.1243	1.1302
49	1.1992	1.2109	1.2227	1.0696	1.0750	1.0804
50	1.1918	1.2030	1.2142	1.0233	1.0282	1.0332
51	1.1847	1.1953	1.2061	.9791	.9836	.9882
52	1.1777	1.1879	1.1982	.9370	.9412	.9454
53	1.1710	1.1808	1.1905	.8968	.9006	.9044
54	1.1646	1.1738	1.1832	.8583	.8618	.8653
55	1.1583	1.1671	1.1760	.8213	.8245	.8277
56	1.1521	1.1606	1.1691	.7858	.7887	.7917
57	1.1462	1.1542	1.1623	.7516	.7543	.7570
58	1.1404	1.1480	1.1556	.7186	.7211	.7236
59	1.1347	1.1420	1.1494	.6868	.6890	.6913
60	1.1292	1.1361	1.1432	.6560	.6581	.6602
61	1.1238	1.1304	1.1371	.6263	.6281	.6301
62	1.1185	1.1248	1.1312	.5974	.5991	.6009
63	1.1133	1.1193	1.1254	.5694	.5710	.5726
64	1.1082	1.1140	1.1197	.5422	.5436	.5451
65	1.1033	1.1087	1.1141	.5158	.5171	.5184
66	1.0984	1.1035	1.1087	.4900	.4912	.4924
67	1.0936	1.0985	1.1054	.4649	.4660	.4671
68	1.0889	1.0935	1.0981	.4405	.4414	.4424
69	1.0843	1.0886	1.0950	.4166	.4174	.4183
70	1.0797	1.0838	1.0879	.3932	.3939	.3947
71	1.0753	1.0791	1.0830	.3703	.3710	.3717
72	1.0709	1.0745	1.0781	.3480	.3485	.3492
73	1.0665	1.0699	1.0733	.3260	.3265	.3271
74	1.0622	1.0654	1.0685	.3045	.3050	.3054
75	1.0580	1.0609	1.0639	.2834	.2838	.2842
76	1.0538	1.0565	1.0592	.2626	.2630	.2633
77	1.0497	1.0522	1.0547	.2422	.2425	.2428
78	1.0457	1.0479	1.0502	.2221	.2224	.2226
79	1.0416	1.0437	1.0458	.2023	.2026	.2028
80	1.0377	1.0395	1.0414	.1829	.1830	.1832
81	1.0337	1.0354	1.0371	.1636	.1638	.1639
82	1.0299	1.0313	1.0328	.1447	.1448	.1449
83	1.0260	1.0273	1.0286	.1259	.1260	.1261
84	1.0222	1.0233	1.0244	.1074	.1074	.1075
85	1.0184	1.0193	1.0202	.0891	.0891	.0891
86	1.0147	1.0154	1.0161	.0709	.0710	.0710
87	1.0110	1.0115	1.0120	.0530	.0530	.0530
88	1.0073	1.0076	1.0080	.0352	.0352	.0352
89	1.0036	1.0038	1.0040	.0175	.0175	.0175
90	1.0000	1.0000	1.0000	.0000	.0000	.0000

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Table 1

$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
40	.8331	.8407	.8485	1.3514	1.3607	1.3701
41	.7707	.7775	.7843	1.2981	1.3067	1.3153
42	.7139	.7199	.7260	1.2479	1.2557	1.2637
43	.6620	.6673	.6727	1.2003	1.2075	1.2149
44	.6143	.6190	.6238	1.1550	1.1617	1.1685
45	.5704	.5745	.5789	1.1119	1.1181	1.1244
46	.5298	.5336	.5374	1.0706	1.0764	1.0822
47	.4923	.4957	.4991	1.0311	1.0364	1.0418
48	.4575	.4605	.4636	.9931	.9981	1.0030
49	.4252	.4279	.4306	.9566	.9612	.9658
50	.3951	.3975	.3999	.9214	.9256	.9298
51	.3670	.3692	.3713	.8873	.8912	.8952
52	.3408	.3427	.3446	.8544	.8580	.8616
53	.3163	.3180	.3197	.8224	.8258	.8292
54	.2934	.2949	.2964	.7915	.7946	.7977
55	.2719	.2733	.2746	.7614	.7642	.7671
56	.2518	.2530	.2542	.7321	.7347	.7374
57	.2329	.2340	.2350	.7036	.7060	.7085
58	.2152	.2161	.2171	.6758	.6780	.6803
59	.1986	.1994	.2002	.6486	.6507	.6528
60	.1830	.1837	.1844	.6221	.6241	.6260
61	.1683	.1689	.1696	.5962	.5980	.5998
62	.1545	.1551	.1557	.5709	.5725	.5741
63	.1416	.1421	.1426	.5460	.5475	.5490
64	.1295	.1299	.1303	.5217	.5231	.5244
65	.1181	.1185	.1188	.4978	.4991	.5003
66	.1074	.1077	.1081	.4744	.4755	.4767
67	.0974	.0977	.0980	.4514	.4524	.4534
68	.0880	.0883	.0885	.4288	.4297	.4306
69	.0793	.0795	.0797	.4066	.4074	.4082
70	.0711	.0713	.0714	.3847	.3854	.3861
71	.0635	.0636	.0637	.3631	.3638	.3644
72	.0564	.0565	.0566	.3419	.3425	.3431
73	.0498	.0499	.0500	.3210	.3215	.3220
74	.0436	.0437	.0438	.3004	.3008	.3012
75	.0380	.0381	.0381	.2800	.2804	.2808
76	.0328	.0329	.0329	.2599	.2602	.2606
77	.0280	.0281	.0281	.2401	.2403	.2406
78	.0237	.0237	.0238	.2205	.2207	.2209
79	.0197	.0198	.0198	.2011	.2013	.2015
80	.0162	.0162	.0162	.1819	.1821	.1822
81	.0130	.0130	.0130	.1629	.1631	.1632
82	.0102	.0102	.0102	.1442	.1443	.1444
83	.0078	.0078	.0078	.1256	.1257	.1257
84	.0057	.0057	.0057	.1072	.1072	.1073
85	.0039	.0039	.0039	.0889	.0890	.0890
86	.0025	.0025	.0025	.0709	.0709	.0709
87	.0014	.0014	.0014	.0529	.0530	.0530
88	.0006	.0006	.0006	.0352	.0352	.0352
89	.0002	.0002	.0002	.0175	.0175	.0175
90	.0000	.0000	.0000	.0000	.0000	.0000

$\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
31	2.1640	2.2478	2.3349	5.9870	6.1162	6.2490
32	1.9415	2.0031	2.0666	4.6008	4.6811	4.7632
33	1.8201	1.8705	1.9223	3.8649	3.9234	3.9829
34	1.7373	1.7806	1.8249	3.3758	3.4213	3.4677
35	1.6748	1.7128	1.7517	3.0151	3.0521	3.0897
36	1.6246	1.6587	1.6935	2.7326	2.7634	2.7946
37	1.5828	1.6136	1.6451	2.5022	2.5284	2.5549
38	1.5469	1.5751	1.6038	2.3090	2.3315	2.3543
39	1.5155	1.5415	1.5679	2.1434	2.1630	2.1828
40	1.4876	1.5116	1.5361	1.9992	2.0163	2.0337
41	1.4624	1.4848	1.5075	1.8718	1.8869	1.9023
42	1.4395	1.4604	1.4816	1.7581	1.7715	1.7852
43	1.4185	1.4381	1.4579	1.6556	1.6676	1.6798
44	1.3991	1.4174	1.4360	1.5626	1.5734	1.5842
45	1.3811	1.3983	1.4157	1.4775	1.4872	1.4970
46	1.3642	1.3804	1.3968	1.3993	1.4080	1.4169
47	1.3483	1.3636	1.3791	1.3270	1.3349	1.3429
48	1.3334	1.3478	1.3625	1.2598	1.2670	1.2742
49	1.3192	1.3329	1.3467	1.1972	1.2037	1.2102
50	1.3057	1.3187	1.3318	1.1386	1.1444	1.1504
51	1.2929	1.3052	1.3176	1.0835	1.0888	1.0942
52	1.2807	1.2923	1.3040	1.0316	1.0364	1.0413
53	1.2689	1.2800	1.2911	.9825	.9869	.9914
54	1.2577	1.2682	1.2787	.9360	.9401	.9441
55	1.2469	1.2568	1.2668	.8919	.8956	.8993
56	1.2365	1.2459	1.2554	.8499	.8532	.8566
57	1.2264	1.2354	1.2444	.8098	.8128	.8159
58	1.2167	1.2252	1.2338	.7714	.7742	.7770
59	1.2073	1.2154	1.2235	.7347	.7372	.7398
60	1.1982	1.2058	1.2135	.6995	.7018	.7041
61	1.1893	1.1966	1.2039	.6656	.6677	.6698
62	1.1807	1.1876	1.1945	.6330	.6349	.6368
63	1.1724	1.1789	1.1854	.6016	.6033	.6050
64	1.1642	1.1704	1.1766	.5712	.5728	.5744
65	1.1563	1.1621	1.1680	.5419	.5433	.5447
66	1.1485	1.1541	1.1596	.5135	.5148	.5160
67	1.1410	1.1462	1.1514	.4860	.4871	.4883
68	1.1336	1.1385	1.1434	.4593	.4603	.4613
69	1.1264	1.1310	1.1356	.4333	.4342	.4351
70	1.1193	1.1236	1.1279	.4081	.4089	.4097
71	1.1123	1.1164	1.1205	.3835	.3842	.3849
72	1.1055	1.1093	1.1131	.3595	.3601	.3608
73	1.0989	1.1024	1.1059	.3361	.3367	.3372
74	1.0923	1.0956	1.0989	.3133	.3138	.3143

$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
31	4.3869	4.4917	4.5956	3.8249	3.8988	3.9747
32	3.2041	3.2673	3.3319	3.1020	3.1505	3.1999
33	2.5833	2.6279	2.6735	2.7071	2.7438	2.7812
34	2.1752	2.2091	2.2437	2.4373	2.4669	2.4970
35	1.8779	1.9047	1.9321	2.2331	2.2579	2.2830
36	1.6478	1.6697	1.6918	2.0691	2.0903	2.1118
37	1.4626	1.4807	1.4991	1.9321	1.9506	1.9692
38	1.3093	1.3245	1.3399	1.8146	1.8308	1.8471
39	1.1797	1.1926	1.2057	1.7115	1.7259	1.7404
40	1.0684	1.0794	1.0906	1.6198	1.6326	1.6456
41	.9715	.9810	.9907	1.5371	1.5486	1.5603
42	.8863	.8946	.9029	1.4617	1.4722	1.4827
43	.8108	.8180	.8252	1.3925	1.4020	1.4115
44	.7433	.7496	.7559	1.3285	1.3371	1.3457
45	.6826	.6881	.6937	1.2689	1.2767	1.2846
46	.6278	.6326	.6375	1.2131	1.2203	1.2274
47	.5780	.5823	.5866	1.1607	1.1672	1.1738
48	.5326	.5364	.5402	1.1111	1.1171	1.1231
49	.4911	.4944	.4978	1.0642	1.0697	1.0752
50	.4530	.4560	.4589	1.0196	1.0247	1.0297
51	.4180	.4206	.4232	.9771	.9818	.9864
52	.3857	.3880	.3903	.9365	.9408	.9450
53	.3558	.3578	.3599	.8976	.9015	.9054
54	.3282	.3299	.3318	.8603	.8638	.8674
55	.3025	.3041	.3057	.8243	.8276	.8309
56	.2787	.2801	.2815	.7897	.7927	.7957
57	.2566	.2578	.2590	.7562	.7590	.7618
58	.2360	.2371	.2382	.7239	.7265	.7290
59	.2168	.2177	.2187	.6926	.6949	.6973
60	.1989	.1997	.2006	.6622	.6644	.6665
61	.1822	.1830	.1837	.6328	.6347	.6367
62	.1667	.1673	.1680	.6041	.6059	.6077
63	.1522	.1527	.1533	.5763	.5779	.5795
64	.1386	.1391	.1396	.5491	.5506	.5520
65	.1260	.1264	.1268	.5226	.5240	.5253
66	.1142	.1146	.1149	.4968	.4980	.4992
67	.1032	.1035	.1039	.4715	.4726	.4737
68	.0930	.0933	.0935	.4469	.4478	.4488
69	.0835	.0837	.0840	.4227	.4236	.4245
70	.0747	.0748	.0750	.3991	.3999	.4006
71	.0664	.0666	.0668	.3759	.3766	.3773
72	.0588	.0590	.0591	.3532	.3538	.3544
73	.0518	.0519	.0520	.3309	.3314	.3319
74	.0453	.0454	.0455	.3090	.3095	.3099

$\phi_c = 30°$ (continued)

$\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
75	1.0859	1.0989	1.0920	.2910	.2914	. 918
76	1.0796	1.0824	1.0852	.2691	.2695	. 598
77	1.0734	1.0759	1.0785	.2477	.2480	.2483
78	1.0672	1.0696	1.0719	.2268	.2270	.2273
79	1.0612	1.0633	1.0655	.2062	.2064	.2066
80	1.0553	1.0572	1.0591	.1860	.1862	.1863
81	1.0494	1.0511	1.0528	.1661	.1663	.1664
82	1.0436	1.0451	1.0466	.1466	.1467	.1468
83	1.0380	1.0393	1.0406	.1274	.1275	.1275
84	1.0323	1.0334	1.0345	.1085	.1085	.1086
85	1.0268	1.0277	1.0286	.0898	.0898	.0899
86	1.0213	1.0220	1.0228	.0714	.0714	.0714
87	1.0159	1.0164	1.0170	.0532	.0532	.0533
88	1.0105	1.0109	1.0112	.0353	.0353	.0353
89	1.0052	1.0054	1.0056	.0175	.0175	.0175
90	1.0000	1.0000	1.0000	.0000	.0000	.0000

$\phi_c = 35°$

$\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
36	2.7129	2.8043	2.8988	5.9550	6.0705	6.1888
37	2.3450	2.4099	2.4765	4.4747	4.5447	4.6160
38	2.1505	2.2024	2.2556	3.7095	3.7597	3.8107
39	2.0204	2.0642	2.1091	3.2090	3.2477	3.2869
40	1.9235	1.9617	2.0006	2.8440	2.8751	2.9066
41	1.8468	1.8806	1.9150	2.5605	2.5862	2.6122
42	1.7834	1.8137	1.8446	2.3309	2.3526	2.3744
43	1.7296	1.7570	1.7850	2.1394	2.1579	2.1766
44	1.6828	1.7079	1.7334	1.9761	1.9920	2.0081
45	1.6415	1.6645	1.6879	1.8343	1.8482	1.8622
46	1.6045	1.6258	1.6474	1.7095	1.7217	1.7340
47	1.5710	1.5908	1.6108	1.5985	1.6092	1.6201
48	1.5405	1.5588	1.5774	1.4987	1.5082	1.5179
49	1.5124	1.5295	1.5468	1.4083	1.4168	1.4253

$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
75	.0394	.0394	.0395	.2875	.2879	.2983
76	.0339	.0339	.0340	.2663	.2667	.2670
77	.0289	.0289	.0290	.2455	.2458	.2461
78	.0244	.0244	.0244	.2250	.2253	.2255
79	.0202	.0203	.0203	.2049	.2051	.2053
80	.0166	.0166	.0166	.1850	.1852	.1853
81	.0133	.0133	.0133	.1654	.1656	.1657
82	.0104	.0104	.0104	.1461	.1462	.1463
83	.0079	.0079	.0079	.1271	.1271	.1272
84	.0057	.0057	.0058	.1083	.1083	.1084
85	.0040	.0040	.0040	.0897	.0897	.0898
86	.0025	.0025	.0025	.0713	.0714	.0714
87	.0014	.0014	.0014	.0532	.0532	.0532
88	.0006	.0006	.0006	.0353	.0353	.0353
89	.0002	.0002	.0002	.0175	.0175	.0175
90	.0000	.0000	.0000	.0000	.0000	.0000

$\phi_c = 35°$

$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
36	4.1149	4.2030	4.2933	4.1166	4.1902	4.2655
37	2.9238	2.9754	3.0279	3.2375	3.2841	3.3316
38	2.3165	2.3523	2.3887	2.7722	2.8067	2.8418
39	1.9246	1.9514	1.9786	2.4608	2.4881	2.5159
40	1.6429	1.6638	1.6850	2.2287	2.2513	2.2742
41	1.4272	1.4441	1.4611	2.0447	2.0637	2.0830
42	1.2552	1.2690	1.2830	1.8926	1.9090	1.9255
43	1.1140	1.1255	1.1371	1.7633	1.7775	1.7919
44	.9955	1.0051	1.0149	1.6508	1.6634	1.6760
45	.8944	.9025	.9108	1.5515	1.5626	1.5737
46	.8069	.8139	.8209	1.4624	1.4724	1.4823
47	.7305	.7364	.7425	1.3820	1.3908	1.3997
48	.6630	.6682	.6734	1.3084	1.3163	1.3243
49	.6031	.6076	.6121	1.2407	1.2479	1.2550

$\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
50	1.4864	1.5024	1.5185	1.3258	1.3334	1.3410
51	1.4621	1.4771	1.4923	1.2501	1.2569	1.2637
52	1.4395	1.4535	1.4677	1.1802	1.1863	1.1924
53	1.4182	1.4314	1.4447	1.1154	1.1209	1.1264
54	1.3981	1.4105	1.4230	1.0550	1.0600	1.0649
55	1.3791	1.3908	1.4025	.9986	1.0030	1.0075
56	1.3610	1.3720	1.3831	.9456	.9496	.9537
57	1.3438	1.3542	1.3646	.8958	.8994	.9030
58	1.3274	1.3372	1.3470	.8488	.8520	.8553
59	1.3117	1.3209	1.3302	.8042	.8071	.8101
60	1.2967	1.3053	1.3141	.7619	.7646	.7672
61	1.2822	1.2904	1.2986	.7217	.7241	.7265
62	1.2683	1.2760	1.2837	.6834	.6855	.6877
63	1.2549	1.2621	1.2694	.6468	.6487	.6506
64	1.2420	1.2488	1.2556	.6117	.6134	.6152
65	1.2294	1.2358	1.2423	.5781	.5797	.5812
66	1.2173	1.2233	1.2294	.5458	.5472	.5486
67	1.2056	1.2112	1.2169	.5148	.5160	.5172
68	1.1942	1.1995	1.2048	.4848	.4859	.4870
69	1.1831	1.1881	1.1930	.4560	.4569	.4579
70	1.1723	1.1770	1.1816	.4281	.4289	.4298
71	1.1618	1.1662	1.1705	.4011	.4018	.4026
72	1.1516	1.1556	1.1597	.3749	.3756	.3762
73	1.1416	1.1454	1.1491	.3495	.3501	.3507
74	1.1319	1.1354	1.1388	.3249	.3254	.3259
75	1.1224	1.1256	1.1288	.3009	.3014	.3018
76	1.1131	1.1160	1.1190	.2776	.2780	.2784
77	1.1040	1.1067	1.1094	.2549	.2552	.2555
78	1.0951	1.0975	1.1000	.2327	.2330	.2333
79	1.0864	1.0886	1.0908	.2111	.2113	.2115
80	1.0778	1.0798	1.0817	.1900	.1902	.1903
81	1.0694	1.0712	1.0729	.1693	.1695	.1696
82	1.0612	1.0627	1.0642	.1491	.1492	.1493
83	1.0531	1.0544	1.0557	.1292	.1293	.1294
84	1.0451	1.0462	1.0474	.1098	.1099	.1099
85	1.0373	1.0382	1.0391	.0907	.0908	.0908
86	1.0296	1.0303	1.0311	.0720	.0720	.0720
87	1.0220	1.0226	1.0231	.0536	.0536	.0536
88	1.0146	1.0149	1.0153	.0354	.0354	.0354
89	1.0072	1.0074	1.0076	.0176	.0176	.0176
90	1.0000	1.0000	1.0000	.0000	.0000	.0000

$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
50	.5495	.5534	.5573	1.1780	1.1844	1.1909
51	.5014	.5047	.5081	1.1196	1.1254	1.1313
52	.4579	.4608	.4637	1.0649	1.0702	1.0755
53	.4184	.4210	.4235	1.0135	1.0183	1.0231
54	.3825	.3847	.3870	.9650	.9693	.9737
55	.3497	.3517	.3536	.9190	.9230	.9270
56	.3197	.3214	.3231	.8754	.8790	.8826
57	.2922	.2937	.2952	.8338	.8371	.8404
58	.2669	.2682	.2695	.7942	.7971	.8001
59	.2436	.2448	.2459	.7562	.7589	.7616
60	.2222	.2232	.2242	.7198	.7222	.7247
61	.2024	.2032	.2041	.6848	.6870	.6892
62	.1841	.1848	.1856	.6511	.6531	.6551
63	.1672	.1678	.1685	.6186	.6204	.6222
64	.1515	.1521	.1526	.5872	.5889	.5905
65	.1371	.1375	.1380	.5569	.5584	.5599
66	.1237	.1241	.1245	.5275	.5289	.5302
67	.1113	.1116	.1120	.4990	.5002	.5014
68	.0998	.1001	.1004	.4714	.4725	.4735
69	.0893	.0895	.0897	.4445	.4455	.4464
70	.0795	.0797	.0799	.4184	.4192	.4201
71	.0705	.0706	.0708	.3929	.3937	.3944
72	.0622	.0623	.0625	.3681	.3688	.3695
73	.0545	.0547	.0548	.3439	.3445	.3451
74	.0475	.0476	.0477	.3203	.3208	.3213
75	.0411	.0412	.0413	.2972	.2977	.2981
76	.0353	.0354	.0354	.2747	.2750	.2754
77	.0300	.0300	.0301	.2526	.2529	.2532
78	.0252	.0252	.0253	.2309	.2312	.2315
79	.0209	.0209	.0209	.2098	.2100	.2102
80	.0170	.0171	.0171	.1890	.1892	.1893
81	.0136	.0136	.0136	.1686	.1687	.1689
82	.0106	.0106	.0106	.1486	.1487	.1488
83	.0080	.0080	.0081	.1289	.1290	.1291
84	.0058	.0058	.0058	.1096	.1097	.1097
85	.0040	.0040	.0040	.0906	.0906	.0907
86	.0025	.0025	.0025	.0719	.0719	.0720
87	.0014	.0014	.0014	.0535	.0535	.0536
88	.0006	.0006	.0006	.0354	.0354	.0354.
89	.0002	.0002	.0002	.0176	.0176	.0176
90	.0000	.0000	.0000	.0000	.0000	.0000

$\phi_c = 40°$

$\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
41	3.4728	3.5754	3.6809	6.0454	6.1516	6.2601
42	2.8726	2.9422	3.0134	4.4094	4.4715	4.5348
43	2.5665	2.6208	2.6762	3.5912	3.6348	3.6790
44	2.3666	2.4115	2.4572	3.0665	3.0996	3.1331
45	2.2203	2.2587	2.2978	2.6894	2.7156	2.7422
46	2.1060	2.1396	2.1737	2.3998	2.4211	2.4428
47	2.0128	2.0425	2.0727	2.1673	2.1851	2.2031
48	1.9343	1.9610	1.9881	1.9748	1.9898	2.0050
49	1.8668	1.8909	1.9154	1.8116	1.8245	1.8375
50	1.8077	1.8296	1.8518	1.6708	1.6819	1.6931
51	1.7551	1.7752	1.7955	1.5475	1.5571	1.5669
52	1.7079	1.7264	1.7450	1.4382	1.4466	1.4552
53	1.6651	1.6821	1.6993	1.3404	1.3478	1.3553
54	1.6259	1.6416	1.6575	1.2521	1.2586	1.2652
55	1.5898	1.6044	1.6192	1.1718	1.1775	1.1834
56	1.5564	1.5700	1.5837	1.0983	1.1034	1.1085
57	1.5253	1.5379	1.5506	1.0306	1.0352	1.0397
58	1.4963	1.5080	1.5198	.9680	.9721	.9762
59	1.4689	1.4799	1.4909	.9099	.9135	.9171
60	1.4432	1.4534	1.4637	.8557	.8589	.8621
61	1.4188	1.4284	1.4380	.8049	.8077	.8106
62	1.3958	1.4047	1.4136	.7572	.7597	.7623
63	1.3738	1.3821	1.3905	.7122	.7145	.7168
64	1.3529	1.3606	1.3684	.6698	.6718	.6738
65	1.3329	1.3401	1.3474	.6295	.6313	.6331
66	1.3137	1.3205	1.3273	.5913	.5929	.5945
67	1.2954	1.3017	1.3080	.5549	.5563	.5577
68	1.2777	1.2836	1.2895	.5202	.5214	.5227
69	1.2608	1.2662	1.2717	.4870	.4881	.4892
70	1.2444	1.2495	1.2546	.4553	.4562	.4572
71	1.2286	1.2333	1.2380	.4248	.4257	.4265
72	1.2134	1.2177	1.2221	.3955	.3963	.3970
73	1.1986	1.2026	1.2066	.3674	.3680	.3686
74	1.1843	1.1880	1.1917	.3402	.3408	.3413
75	1.1704	1.1738	1.1772	.3140	.3145	.3150
76	1.1569	1.1600	1.1631	.2887	.2891	.2895
77	1.1438	1.1467	1.1495	.2642	.2646	.2649
78	1.1311	1.1337	1.1362	.2405	.2408	.2410
79	1.1187	1.1210	1.1233	.2175	.2177	.2179
80	1.1066	1.1087	1.1107	.1951	.1953	.1955
81	1.0948	1.0966	1.0985	.1734	.1735	.1736
82	1.0833	1.0849	1.0865	.1522	.1523	.1524
83	1.0721	1.0735	1.0748	.1316	.1317	.1318
84	1.0611	1.0623	1.0634	.1115	.1116	.1116
85	1.0504	1.0513	1.0523	.0919	.0919	.0919
86	1.0399	1.0406	1.0414	.0727	.0727	.0727
87	1.0296	1.0302	1.0307	.0539	.0540	.0540
88	1.0196	1.0199	1.0203	.0356	.0356	.0356
89	1.0097	1.0099	1.0100	.0176	.0176	.0176
90	1.0000	1.0000	1.0000	.0000	.0000	.0000

64

$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
41	3.9067	3.9821	4.0593	4.4726	4.5467	4.6223
42	2.6800	2.7224	2.7656	3.3901	3.4351	3.4807
43	2.0764	2.1051	2.1342	2.8378	2.8702	2.9031
44	1.6956	1.7166	1.7380	2.4769	2.5020	2.5275
45	1.4265	1.4427	1.4591	2.2127	2.2331	2.2537
46	1.2234	1.2362	1.2492	2.0062	2.0231	2.0402
47	1.0633	1.0737	1.0841	1.8376	1.8519	1.8664
48	.9333	.9417	.9503	1.6957	1.7080	1.7204
49	.8251	.8321	.8392	1.5735	1.5842	1.5949
50	.7336	.7395	.7455	1.4664	1.4758	1.4852
51	.6552	.6601	.6651	1.3713	1.3795	1.3878
52	.5872	.5914	.5956	1.2858	1.2931	1.3004
53	.5276	.5312	.5348	1.2082	1.2147	1.2211
54	.4751	.4781	.4812	1.1372	1.1430	1.1487
55	.4284	.4310	.4336	1.0719	1.0770	1.0821
56	.3868	.3890	.3913	1.0113	1.0159	1.0205
57	.3494	.3513	.3533	.9549	.9590	.9631
58	.3158	.3175	.3191	.9021	.9058	.9095
59	.2854	.2868	.2883	.8526	.8558	.8591
60	.2579	.2591	.2603	.8058	.8088	.8117
61	.2329	.2339	.2350	.7616	.7643	.7669
62	.2101	.2110	.2119	.7197	.7221	.7244
63	.1894	.1901	.1909	.6798	.6820	.6841
64	.1704	.1711	.1717	.6418	.6437	.6456
65	.1531	.1536	.1542	.6055	.6072	.6089
66	.1372	.1377	.1382	.5707	.5722	.5737
67	.1227	.1231	.1235	.5374	.5387	.5400
68	.1094	.1098	.1101	.5053	.5065	.5077
69	.0973	.0976	.0978	.4744	.4755	.4765
70	.0862	.0864	.0866	.4447	.4456	.4466
71	.0760	.0762	.0764	.4160	.4168	.4176
72	.0667	.0669	.0670	.3882	.3889	.3897
73	.0582	.0583	.0585	.3614	.3620	.3626
74	.0505	.0506	.0507	.3353	.3359	.3364
75	.0435	.0436	.0437	.3101	.3106	.3110
76	.0372	.0372	.0373	.2856	.2860	.2864
77	.0315	.0315	.0315	.2618	.2621	.2624
78	.0263	.0264	.0264	.2386	.2389	.2391
79	.0217	.0217	.0218	.2160	.2163	.2165
80	.0176	.0177	.0177	.1940	.1942	.1944
81	.0141	.0141	.0141	.1726	.1728	.1729
82	.0109	.0109	.0109	.1517	.1518	.1519
83	.0082	.0082	.0082	.1313	.1313	.1314
84	.0060	.0060	.0060	.1113	.1113	.1114
85	.0041	.0041	.0041	.0917	.0918	.0918
86	.0026	.0026	.0026	.0726	.0727	.0727
87	.0014	.0014	.0014	.0539	.0539	.0540
88	.0006	.0006	.0006	.0356	.0356	.0356
89	.0002	.0002	.0002	.0176	.0176	.0176
90	.0000	.0000	.0000	.0000	.0000	.0000

65

$$\phi_c = 45°$$

$\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
46	4.5053	4.6219	4.7415	6.2026	6.3013	6.4019
47	3.5423	3.6173	3.6938	4.3586	4.4138	4.4699
48	3.0714	3.1280	3.1856	3.4716	3.5092	3.5474
49	2.7719	2.8176	2.8640	2.9163	2.9442	2.9725
50	2.5571	2.5954	2.6343	2.5240	2.5457	2.5677
51	2.3920	2.4249	2.4583	2.2267	2.2441	2.2618
52	2.2590	2.2878	2.3170	1.9907	2.0050	2.0195
53	2.1485	2.1740	2.1998	1.7971	1.8090	1.8211
54	2.0544	2.0771	2.1001	1.6343	1.6444	1.6546
55	1.9727	1.9932	2.0138	1.4948	1.5034	1.5121
56	1.9008	1.9193	1.9380	1.3735	1.3808	1.3883
57	1.8367	1.8535	1.8704	1.2665	1.2729	1.2793
58	1.7789	1.7942	1.8097	1.1712	1.1768	1.1823
59	1.7264	1.7405	1.7546	1.0856	1.0904	1.0953
60	1.6785	1.6913	1.7043	1.0081	1.0123	1.0166
61	1.6343	1.6461	1.6580	.9375	.9412	.9448
62	1.5934	1.6043	1.6152	.8727	.8759	.8792
63	1.5553	1.5654	1.5755	.8130	.8158	.8186
64	1.5198	1.5290	1.5384	.7577	.7602	.7626
65	1.4864	1.4950	1.5035	.7063	.7084	.7106
66	1.4551	1.4630	1.4709	.6583	.6602	.6621
67	1.4255	1.4328	1.4401	.6133	.6150	.6166
68	1.3974	1.4042	1.4109	.5710	.5725	.5739
69	1.3708	1.3770	1.3832	.5312	.5325	.5337
70	1.3455	1.3512	1.3570	.4935	.4947	.4958
71	1.3214	1.3266	1.3319	.4579	.4588	.4598
72	1.2983	1.3032	1.3080	.4240	.4248	.4257
73	1.2763	1.2807	1.2851	.3918	.3925	.3932
74	1.2551	1.2592	1.2632	.3610	.3616	.3622
75	1.2348	1.2385	1.2422	.3316	.3321	.3327
76	1.2153	1.2186	1.2220	.3035	.3039	.3044
77	1.1965	1.1995	1.2025	.2765	.2769	.2773
78	1.1783	1.1810	1.1838	.2506	.2509	.2512
79	1.1608	1.1632	1.1657	.2257	.2260	.2262
80	1.1439	1.1460	1.1482	.2017	.2019	.2021
81	1.1275	1.1294	1.1313	.1786	.1787	.1789
82	1.1116	1.1133	1.1149	.1562	.1563	.1564
83	1.0962	1.0977	1.0991	.1346	.1347	.1347
84	1.0813	1.0825	1.0837	.1136	.1137	.1137
85	1.0668	1.0678	1.0688	.0933	.0933	.0934
86	1.0527	1.0535	1.0542	.0736	.0736	.0736
87	1.0390	1.0396	1.0401	.0544	.0545	.0545
88	1.0257	1.0260	1.0264	.0358	.0358	.0358
89	1.0127	1.0129	1.0130	.0177	.0177	.0177
90	1.0000	1.0000	1.0000	.0000	.0000	.0000

$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
46	3.7065	3.7710	3.8368	4.8696	4.9439	5.0196
47	2.4355	2.4699	2.5050	3.5338	3.5766	3.6200
48	1.8357	1.8583	1.8812	2.8803	2.9101	2.9404
49	1.4675	1.4836	1.5000	2.4646	2.4872	2.5100
50	1.2126	1.2247	1.2370	2.1664	2.1843	2.2024
51	1.0234	1.0328	1.0423	1.9370	1.9517	1.9664
52	.8764	.8839	.8914	1.7524	1.7646	1.7768
53	.7586	.7646	.7706	1.5989	1.6091	1.6195
54	.6617	.6666	.6715	1.4680	1.4768	1.4856
55	.5807	.5847	.5888	1.3545	1.3621	1.3696
56	.5119	.5153	.5186	1.2545	1.2610	1.2676
57	.4529	.4556	.4584	1.1653	1.1710	1.1767
58	.4017	.4040	.4063	1.0850	1.0900	1.0950
59	.3569	.3589	.3608	1.0120	1.0164	1.0208
60	.3176	.3192	.3209	.9452	.9491	.9529
61	.2828	.2842	.2856	.8837	.8871	.8905
62	.2519	.2530	.2542	.8268	.8298	.8328
63	.2243	.2253	.2263	.7738	.7765	.7791
64	.1996	.2004	.2013	.7244	.7267	.7290
65	.1775	.1782	.1789	.6780	.6800	.6820
66	.1576	.1581	.1587	.6343	.6361	.6379
67	.1396	.1401	.1406	.5930	.5946	.5962
68	.1235	.1239	.1243	.5540	.5554	.5568
69	.1089	.1092	.1095	.5169	.5181	.5194
70	.0957	.0959	.0962	.4817	.4827	.4838
71	.0838	.0840	.0842	.4480	.4490	.4499
72	.0730	.0732	.0734	.4159	.4167	.4175
73	.0633	.0635	.0636	.3852	.3859	.3865
74	.0546	.0547	.0548	.3557	.3563	.3569
75	.0467	.0468	.0469	.3274	.3279	.3284
76	.0397	.0398	.0398	.3002	.3006	.3010
77	.0334	.0334	.0335	.2739	.2743	.2746
78	.0278	.0278	.0279	.2486	.2489	.2492
79	.0228	.0228	.0229	.2242	.2245	.2247
80	.0184	.0185	.0185	.2006	.2008	.2010
81	.0146	.0146	.0146	.1778	.1779	.1781
82	.0113	.0113	.0113	.1557	.1558	.1559
83	.0085	.0085	.0085	.1342	.1343	.1344
84	.0061	.0061	.0061	.1134	.1135	.1135
85	.0042	.0042	.0042	.0932	.0932	.0933
86	.0026	.0026	.0026	.0735	.0736	.0736
87	.0014	.0014	.0014	.0544	.0544	.0544
88	.0006	.0006	.0006	.0358	.0358	.0358
89	.0002	.0002	.0002	.0177	.0177	.0177
90	.0000	.0000	.0000	.0000	.0000	.0000

67

$$\phi_c = 50°$$

$\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
51	5.8621	5.9941	6.1292	6.3542	6.4451	6.5375
52	4.3537	4.4335	4.5147	4.2697	4.3179	4.3666
53	3.6499	3.7079	3.7668	3.3107	3.3424	3.3744
54	3.2156	3.2611	3.3073	2.7266	2.7495	2.7726
55	2.9111	2.9484	2.9862	2.3221	2.3395	2.3571
56	2.6811	2.7125	2.7443	2.0203	2.0341	2.0479
57	2.4987	2.5257	2.5530	1.7839	1.7949	1.8061
58	2.3491	2.3726	2.3963	1.5920	1.6011	1.6102
59	2.2232	2.2439	2.2647	1.4323	1.4398	1.4474
60	2.1150	2.1334	2.1519	1.2965	1.3028	1.3091
61	2.0207	2.0371	2.0535	1.1792	1.1846	1.1899
62	1.9373	1.9520	1.9668	1.0766	1.0811	1.0857
63	1.8629	1.8761	1.8894	.9858	.9896	.9935
64	1.7958	1.8077	1.8197	.9046	.9079	.9112
65	1.7348	1.7456	1.7565	.8315	.8343	.8372
66	1.6791	1.6889	1.6987	.7652	.7676	.7701
67	1.6278	1.6367	1.6457	.7047	.7068	.7089
68	1.5804	1.5885	1.5966	.6492	.6509	.6527
69	1.5364	1.5437	1.5511	.5979	.5995	.6010
70	1.4953	1.5020	1.5087	.5505	.5518	.5531
71	1.4569	1.4630	1.4691	.5063	.5075	.5086
72	1.4208	1.4264	1.4319	.4651	.4661	.4671
73	1.3869	1.3919	1.3969	.4266	.4274	.4282
74	1.3548	1.3593	1.3638	.3903	.3910	.3917
75	1.3244	1.3285	1.3326	.3561	.3567	.3573
76	1.2955	1.2992	1.3029	.3239	.3244	.3248
77	1.2681	1.2714	1.2747	.2933	.2937	.2941
78	1.2420	1.2449	1.2479	.2643	.2647	.2650
79	1.2170	1.2197	1.2223	.2368	.2370	.2373
80	1.1932	1.1955	1.1978	.2105	.2107	.2109
81	1.1704	1.1724	1.1744	.1854	.1856	.1857
82	1.1484	1.1502	1.1519	.1614	.1615	.1616
83	1.1274	1.1289	1.1303	.1384	.1385	.1386
84	1.1072	1.1084	1.1096	.1163	.1164	.1165
85	1.0877	1.0887	1.0897	.0951	.0952	.0952
86	1.0689	1.0697	1.0705	.0747	.0748	.0748
87	1.0508	1.0514	1.0519	.0551	.0551	.0551
88	1.0333	1.0337	1.0340	.0361	.0361	.0361
89	1.0164	1.0166	1.0167	.0177	.0177	.0177
90	1.0000	1.0000	1.0000	.0000	.0000	.0000

68

$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
51	3.4591	3.5129	3.5675	5.2562	5.3292	5.4035
52	2.1592	2.1863	2.2137	3.6267	3.6663	3.7064
53	1.5748	1.5918	1.6090	2.8664	2.8929	2.9198
54	1.2270	1.2388	1.2507	2.3970	2.4165	2.4362
55	.9920	1.0006	1.0093	2.0679	2.0829	2.0981
56	.8210	.8275	.8341	1.8193	1.8312	1.8433
57	.6904	.6954	.7005	1.6221	1.6319	1.6418
58	.5873	.5912	.5953	1.4604	1.4684	1.4766
59	.5038	.5069	.5101	1.3242	1.3309	1.3378
60	.4348	.4374	.4399	1.2072	1.2129	1.2187
61	.3771	.3791	.3812	1.1051	1.1100	1.1149
62	.3281	.3298	.3314	1.0150	1.0191	1.0233
63	.2861	.2875	.2889	.9344	.9380	.9416
64	.2499	.2510	.2522	.8618	.8648	.8679
65	.2184	.2193	.2203	.7958	.7984	.8011
66	.1909	.1917	.1924	.7355	.7378	.7401
67	.1668	.1674	.1680	.6800	.6819	.6839
68	.1455	.1460	.1465	.6287	.6304	.6321
69	.1267	.1272	.1276	.5810	.5825	.5839
70	.1101	.1105	.1108	.5366	.5378	.5391
71	.0954	.0957	.0959	.4950	.4960	.4971
72	.0823	.0825	.0827	.4559	.4568	.4577
73	.0707	.0709	.0710	.4191	.4199	.4207
74	.0604	.0605	.0607	.3843	.3850	.3857
75	.0513	.0514	.0515	.3514	.3520	.3526
76	.0432	.0433	.0434	.3202	.3207	.3211
77	.0361	.0361	.0362	.2905	.2909	.2913
78	.0298	.0298	.0299	.2622	.2625	.2628
79	.0243	.0243	.0244	.2351	.2354	.2357
80	.0195	.0195	.0195	.2093	.2095	.2097
81	.0154	.0154	.0154	.1846	.1847	.1849
82	.0118	.0118	.0118	.1608	.1610	.1611
83	.0088	.0088	.0088	.1380	.1381	.1382
84	.0063	.0063	.0063	.1161	.1162	.1162
85	.0043	.0043	.0043	.0950	.0951	.0951
86	.0027	.0027	.0027	.0747	.0747	.0747
87	.0015	.0015	.0015	.0550	.0550	.0551
88	.0006	.0006	.0006	.0361	.0361	.0361
89	.0002	.0002	.0002	.0177	.0177	.0177
90	.0000	.0000	.0000	.0000	.0000	.0000

$\phi_c = 55°$

$\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
56	7.5427	7.6885	7.8372	6.3950	6.4758	6.5578
57	5.2634	5.3456	5.4291	4.0799	4.1200	4.1606
58	4.2535	4.3107	4.3687	3.0661	3.0914	3.1170
59	3.6503	3.6938	3.7378	2.4671	2.4849	2.5027
60	3.2376	3.2723	3.3073	2.0615	2.0747	2.0879
61	2.9319	2.9605	2.9893	1.7642	1.7743	1.7845
62	2.6936	2.7176	2.7419	1.5346	1.5426	1.5506
63	2.5009	2.5214	2.5421	1.3506	1.3570	1.3634
64	2.3406	2.3584	2.3762	1.1990	1.2042	1.2094
65	2.2046	2.2201	2.2356	1.0714	1.0756	1.0799
66	2.0872	2.1008	2.1144	.9621	.9656	.9691
67	1.9844	1.9954	2.0084	.8672	.8701	.8730
68	1.8935	1.9040	1.9147	.7838	.7862	.7886
69	1.8121	1.8215	1.8310	.7097	.7117	.7138
70	1.7389	1.7472	1.7556	.6435	.6451	.6468
71	1.6723	1.6798	1.6873	.5837	.5851	.5865
72	1.6116	1.6182	1.6249	.5294	.5306	.5318
73	1.5558	1.5617	1.5677	.4798	.4808	.4818
74	1.5043	1.5096	1.5149	.4343	.4351	.4360
75	1.4566	1.4613	1.4660	.3924	.3930	.3937
76	1.4122	1.4164	1.4206	.3535	.3541	.3546
77	1.3708	1.3745	1.3782	.3174	.3179	.3183
78	1.3319	1.3352	1.3385	.2837	.2841	.2844
79	1.2955	1.2983	1.3012	.2522	.2525	.2528
80	1.2611	1.2636	1.2661	.2226	.2228	.2230
81	1.2287	1.2308	1.2330	.1947	.1949	.1950
82	1.1980	1.1998	1.2017	.1684	.1685	.1687
83	1.1609	1.1704	1.1730	.1435	.1436	.1437
84	1.1412	1.1425	1.1438	.1199	.1200	.1201
85	1.1149	1.1159	1.1170	.0975	.0976	.0976
86	1.0898	1.0906	1.0914	.0762	.0762	.0762
87	1.0659	1.0664	1.0670	.0558	.0559	.0559
88	1.0430	1.0433	1.0437	.0364	.0364	.0364
89	1.0210	1.0212	1.0214	.0178	.0178	.0178
90	1.0000	1.0000	1.0000	.0000	.0000	.0000

$\phi_c = 55°$

Table 1

$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
56	3.1091	3.1515	3.1946	5.5380	5.6066	5.6762
57	1.8285	1.8483	1.8685	3.6094	3.6442	3.6793
58	1.2830	1.2949	1.3070	2.7549	2.7771	2.7996
59	.9697	.9777	.9857	2.2444	2.2602	2.2761
60	.7637	.7693	.7750	1.8950	1.9069	1.9188
61	.6172	.6213	.6254	1.6363	1.6455	1.6547
62	.5076	.5106	.5137	1.4346	1.4419	1.4492
63	.4225	.4249	.4273	1.2714	1.2773	1.2832
64	.3549	.3567	.3585	1.1357	1.1405	1.1454
65	.2999	.3013	.3027	1.0206	1.0245	1.0285
66	.2545	.2557	.2568	.9211	.9244	.9277
67	.2167	.2176	.2184	.8341	.8368	.8396
68	.1847	.1854	.1861	.7570	.7593	.7617
69	.1576	.1581	.1587	.6882	.6901	.6920
70	.1344	.1348	.1352	.6261	.6277	.6293
71	.1144	.1148	.1151	.5697	.5711	.5725
72	.0972	.0974	.0977	.5183	.5194	.5205
73	.0823	.0825	.0827	.4710	.4719	.4729
74	.0693	.0695	.0697	.4274	.4282	.4290
75	.0581	.0583	.0584	.3869	.3876	.3883
76	.0484	.0485	.0486	.3493	.3499	.3504
77	.0400	.0400	.0401	.3142	.3146	.3151
78	.0327	.0327	.0328	.2813	.2817	.2820
79	.0264	.0264	.0264	.2504	.2507	.2510
80	.0210	.0210	.0210	.2213	.2215	.2217
81	.0164	.0164	.0164	.1938	.1940	.1942
82	.0125	.0125	.0125	.1678	.1679	.1681
83	.0092	.0092	.0092	.1431	.1432	.1433
84	.0066	.0066	.0066	.1197	.1198	.1198
85	.0044	.0044	.0044	.0974	.0974	.0975
86	.0027	.0027	.0027	.0761	.0762	.0762
87	.0015	.0015	.0015	.0558	.0558	.0559
88	.0006	.0006	.0006	.0364	.0364	.0364
89	.0002	.0002	.0002	.0178	.0178	.0178
90	.0000	.0000	.0000	.0000	.0000	.0000

$$\phi_c = 60°$$

$\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
61	9.4185	9.5712	9.7263	6.1831	6.2501	6.3181
62	6.1531	6.2328	6.3136	3.7224	3.7534	3.7846
63	4.7836	4.8365	4.8899	2.7003	2.7189	2.7377
64	3.9935	4.0322	4.0713	2.1159	2.1284	2.1410
65	3.4665	3.4966	3.5268	1.7294	1.7384	1.7474
66	3.0844	3.1085	3.1327	1.4514	1.4581	1.4648
67	2.7916	2.8113	2.8312	1.2400	1.2452	1.2503
68	2.5583	2.5748	2.5914	1.0729	1.0769	1.0809
69	2.3669	2.3809	2.3949	.9367	.9399	.9431
70	2.2064	2.2183	2.2303	.8233	.8258	.8283
71	2.0694	2.0796	2.0899	.7271	.7291	.7311
72	1.9507	1.9595	1.9684	.6442	.6458	.6474
73	1.8465	1.8542	1.8619	.5719	.5732	.5745
74	1.7543	1.7609	1.7676	.5082	.5092	.5103
75	1.6718	1.6776	1.6834	.4515	.4524	.4532
76	1.5975	1.6025	1.6076	.4007	.4014	.4021
77	1.5302	1.5345	1.5389	.3549	.3554	.3559
78	1.4688	1.4726	1.4763	.3132	.3136	.3141
79	1.4125	1.4158	1.4190	.2752	.2755	.2759
80	1.3607	1.3635	1.3663	.2403	.2405	.2408
81	1.3128	1.3151	1.3175	.2081	.2083	.2085
82	1.2683	1.2703	1.2723	.1783	.1785	.1786
83	1.2269	1.2285	1.2302	.1507	.1508	.1509
84	1.1882	1.1895	1.1909	.1249	.1249	.1250
85	1.1519	1.1530	1.1541	.1008	.1008	.1009
86	1.1179	1.1187	1.1196	.0782	.0782	.0782
87	1.0859	1.0865	1.0871	.0569	.0569	.0569
88	1.0556	1.0560	1.0564	.0369	.0369	.0369
89	1.0271	1.0272	1.0274	.0179	.0179	.0179
90	1.0000	1.0000	1.0000	.0000	.0000	.0000

72

$\phi°$	ξ			η		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
61	2.6145	2.6450	2.6759	5.5711	5.6308	5.6912
62	1.4370	1.4502	1.4635	3.4106	3.4385	3.4667
63	.9642	.9716	.9792	2.5044	2.5214	2.5385
64	.7030	.7078	.7126	1.9815	1.9931	2.0047
65	.5365	.5397	.5430	1.6328	1.6412	1.6496
66	.4211	.4234	.4257	1.3799	1.3862	1.3925
67	.3368	.3384	.3401	1.1861	1.1909	1.1958
68	.2727	.2739	.2752	1.0317	1.0355	1.0393
69	.2228	.2237	.2246	.9050	.9080	.9111
70	.1831	.1837	.1844	.7988	.8012	.8036
71	.1509	.1514	.1519	.7081	.7100	.7120
72	.1246	.1250	.1254	.6295	.6310	.6326
73	.1028	.1031	.1034	.5606	.5618	.5631
74	.0847	.0850	.0852	.4995	.5005	.5015
75	.0696	.0698	.0699	.4449	.4457	.4465
76	.0569	.0570	.0571	.3957	.3963	.3970
77	.0461	.0462	.0463	.3511	.3516	.3522
78	.0371	.0372	.0372	.3104	.3109	.3113
79	.0295	.0296	.0296	.2732	.2735	.2738
80	.0232	.0232	.0232	.2389	.2391	.2394
81	.0179	.0179	.0179	.2071	.2073	.2075
82	.0135	.0135	.0135	.1777	.1778	.1780
83	.0098	.0099	.0099	.1502	.1503	.1505
84	.0069	.0069	.0069	.1246	.1247	.1248
85	.0046	.0046	.0046	.1006	.1007	.1007
86	.0028	.0028	.0028	.0781	.0781	.0781
87	.0015	.0015	.0015	.0569	.0569	.0569
88	.0007	.0007	.0007	.0369	.0369	.0369
89	.0002	.0002	.0002	.0179	.0179	.0179
90	.0000	.0000	.0000	.0000	.0000	.0000

73

$$\phi_c = 65°$$

$\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
66	11.1380	11.2839	11.4316	5.5677	5.6174	5.6675
67	6.8060	6.8762	6.9471	3.1490	3.1701	3.1913
68	5.0880	5.1322	5.1768	2.1971	2.2092	2.2212
69	4.1312	4.1623	4.1936	1.6708	1.6785	1.6863
70	3.5096	3.5329	3.5563	1.3311	1.3364	1.3418
71	3.0681	3.0862	3.1044	1.0914	1.0952	1.0990
72	2.7357	2.7502	2.7647	.9120	.9149	.9177
73	2.4750	2.4867	2.4985	.7721	.7742	.7763
74	2.2639	2.2736	2.2833	.6595	.6611	.6626
75	2.0891	2.0971	2.1051	.5666	.5678	.5690
76	1.9414	1.9481	1.9548	.4885	.4895	.4904
77	1.8148	1.8204	1.8260	.4218	.4226	.4233
78	1.7047	1.7094	1.7141	.3642	.3647	.3652
79	1.6081	1.6120	1.6160	.3137	.3141	.3145
80	1.5224	1.5257	1.5290	.2691	.2694	.2697
81	1.4458	1.4486	1.4513	.2293	.2296	.2298
82	1.3769	1.3792	1.3815	.1937	.1938	.1940
83	1.3145	1.3164	1.3182	.1615	.1616	.1617
84	1.2577	1.2592	1.2607	.1322	.1323	.1324
85	1.2058	1.2069	1.2081	.1055	.1055	.1056
86	1.1580	1.1589	1.1598	.0810	.0810	.0810
87	1.1140	1.1146	1.1152	.0584	.0584	.0584
88	1.0732	1.0735	1.0740	.0375	.0375	.0375
89	1.0353	1.0355	1.0357	.0181	.0181	.0181
90	1.0000	1.0000	1.0000	.0000	.0000	.0000

$$\phi_c = 70°$$

$\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
71	12.0884	12.2090	12.3309	4.4580	4.4986	4.5295
72	6.9282	6.9815	7.0352	2.3677	2.3796	2.3915
73	4.9896	5.0213	5.0533	1.5833	1.5896	1.5960
74	3.9458	3.9672	3.9886	1.1633	1.1671	1.1710
75	3.2846	3.2999	3.3153	.8985	.9010	.9035
76	2.8243	2.8358	2.8473	.7151	.7168	.7185
77	2.4836	2.4924	2.5012	.5799	.5810	.5822
78	2.2201	2.2270	2.2339	.4757	.4766	.4774
79	2.0096	2.0150	2.0205	.3928	.3934	.3940
80	1.8372	1.8415	1.8459	.3252	.3256	.3260
81	1.6931	1.6965	1.7000	.2688	.2691	.2694
82	1.5707	1.5734	1.5762	.2211	.2213	.2215
83	1.4653	1.4674	1.4696	.1801	.1802	.1803
84	1.3735	1.3752	1.3768	.1444	.1445	.1446
85	1.2927	1.2940	1.2953	.1131	.1132	.1132
86	1.2211	1.2220	1.2230	.0854	.0854	.0854
87	1.1571	1.1577	1.1584	.0606	.0606	.0607
88	1.0995	1.0999	1.1003	.0384	.0384	.0384
89	1.0474	1.0476	1.0478	.0183	.0183	.0183
90	1.0000	1.0000	1.0000	.0000	.0000	.0000

74

$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
66	1.9745	1.9933	2.0124	5.1875	5.2334	5.2797
67	1.0063	1.0137	1.0212	2.9710	2.9907	3.0106
68	.6412	.6451	.6491	2.0920	2.1034	2.1147
69	.4479	.4502	.4526	1.6024	1.6098	1.6171
70	.3288	.3303	.3318	1.2844	1.2894	1.2945
71	.2487	.2497	.2507	1.0585	1.0621	1.0658
72	.1917	.1924	.1931	.8884	.8911	.8938
73	.1495	.1500	.1505	.7549	.7570	.7590
74	.1175	.1179	.1182	.6469	.6485	.6500
75	.0927	.0929	.0932	.5574	.5586	.5598
76	.0731	.0733	.0735	.4819	.4828	.4837
77	.0575	.0576	.0578	.4170	.4177	.4184
78	.0450	.0451	.0452	.3607	.3613	.3618
79	.0350	.0350	.0351	.3113	.3117	.3121
80	.0268	.0269	.0269	.2674	.2677	.2680
81	.0203	.0203	.0203	.2282	.2284	.2287
82	.0150	.0150	.0150	.1929	.1931	.1933
83	.0108	.0108	.0108	.1610	.1611	.1612
84	.0075	.0075	.0075	.1319	.1320	.1321
85	.0049	.0049	.0049	.1053	.1054	.1054
86	.0030	.0030	.0030	.0809	.0809	.0810
87	.0016	.0016	.0016	.0583	.0584	.0584
88	.0007	.0007	.0007	.0375	.0375	.0375
89	.0002	.0002	.0002	.0181	.0181	.0181
90	.0000	.0000	.0000	.0000	.0000	.0000

$\phi_c = 70°$

$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
71	1.2604	1.2696	1.2790	4.2776	4.3067	4.3362
72	.5904	.5937	.5970	2.2870	2.2984	2.3098
73	.3538	.3554	.3570	1.5392	1.5453	1.5514
74	.2342	.2351	.2360	1.1365	1.1402	1.1440
75	.1633	.1638	.1643	.8814	.8838	.8863
76	.1172	.1176	.1179	.7038	.7055	.7072
77	.0856	.0858	.0860	.5724	.5735	.5747
78	.0631	.0632	.0633	.4707	.4716	.4724
79	.0465	.0466	.0467	.3895	.3901	.3907
80	.0342	.0342	.0343	.3230	.3234	.3238
81	.0248	.0249	.0249	.2674	.2677	.2680
82	.0178	.0178	.0178	.2202	.2204	.2206
83	.0124	.0124	.0124	.1795	.1797	.1798
84	.0084	.0084	.0084	.1441	.1442	.1443
85	.0054	.0054	.0054	.1129	.1130	.1131
86	.0032	.0032	.0032	.0853	.0853	.0854
87	.0017	.0017	.0017	.0606	.0606	.0606
88	.0007	.0007	.0007	.0384	.0384	.0384
89	.0002	.0002	.0002	.0183	.0183	.0183
90	.0000	.0000	.0000	.0000	.0000	.0000

$\phi_c = 75°$

$\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
76	11.5457	11.6254	11.7057	2.9847	2.9988	3.0130
77	6.2522	6.2844	6.3167	1.4781	1.4830	1.4880
78	4.3574	4.3754	4.3934	.9412	.9436	.9460
7:	3.3676	3.3790	3.3905	.6617	.6630	.6644
80	2.7543	2.7621	2.7699	.4891	.4900	.4908
81	2.3350	2.3405	2.3460	.3715	.3720	.3725
82	2.0291	2.0331	2.0371	.2860	.2863	.2866
83	1.7957	1.7986	1.8015	.2208	.2210	.2212
84	1.6112	1.6134	1.6155	.1695	.1696	.1697
85	1.4617	1.4632	1.4648	.1279	.1280	.1281
86	1.3379	1.3389	1.3400	.0936	.0936	.0936
87	1.2335	1.2343	1.2350	.0646	.0647	.0647
88	1.1444	1.1448	1.1453	.0400	.0400	.0400
89	1.0673	1.0675	1.0677	.0185	.0186	.0185
90	1.0000	1.0000	1.0000	.0000	.0000	.0000

$\phi_c = 80°$

$\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
81	9.0722	9.1083	9.1445	1.4556	1.4594	1.4633
82	4.6993	4.7123	4.7254	.6651	.6663	.6674
83	3.1931	3.1998	3.2065	.3936	.3940	.3945
84	2.4249	2.4287	2.4326	.2554	.2556	.2558
85	1.9572	1.9596	1.9619	.1714	.1715	.1716
86	1.6419	1.6433	1.6448	.1148	.1149	.1149
87	1.4145	1.4154	1.4163	.0741	.0742	.0742
88	1.2427	1.2432	1.2437	.0434	.0434	.0434
89	1.1082	1.1084	1.1086	.0193	.0193	.0193
90	1.0000	1.0000	1.0000	.0000	.0000	.0000

$\phi_c = 85°$

$\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
86	4.9251	4.9320	4.9389	.3449	.3452	.3455
87	2.4817	2.4837	2.4857	.1301	.1302	.1302
88	1.6607	1.6615	1.6622	.0580	.0580	.0580
89	1.2483	1.2485	1.2488	.0218	.0218	.0218
90	1.0000	1.0000	1.0000	.0000	.0000	.0000

Table 1

$$\phi_c = 75°$$

$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
76	.6154	.6186	.6217	2.9171	2.9309	2.9447
77	.2611	.2620	.2630	1.4529	1.4577	1.4625
78	.1443	.1447	.1451	.9287	.9311	.9335
79	.0883	.0886	.0888	.6549	.6563	.6576
80	.0568	.0569	.0570	.4853	.4861	.4869
81	.0373	.0374	.0374	.3693	.3698	.3703
82	.0246	.0247	.0247	.2847	.2850	.2853
83	.0161	.0161	.0161	.2201	.2203	.2205
84	.0103	.0103	.0103	.1691	.1692	.1693
85	.0063	.0063	.0063	.1277	.1278	.1279
86	.0036	.0036	.0036	.0935	.0935	.0935
87	.0018	.0018	.0018	.0646	.0646	.0646
88	.0007	.0007	.0007	.0400	.0400	.0400
89	.0002	.0002	.0002	.0186	.0186	.0186
90	.0000	.0000	.0000	.0000	.0000	.0000

$$\phi_c = 80°$$

$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
81	.1871	.1876	.1881	1.4427	1.4465	1.4504
82	.0687	.0689	.0690	.6611	.6623	.6634
83	.0330	.0330	.0331	.3920	.3925	.3929
84	.0172	.0173	.0173	.2547	.2549	.2551
85	.0091	.0091	.0091	.1711	.1712	.1713
86	.0047	.0047	.0047	.1147	.1148	.1148
87	.0022	.0022	.0022	.0741	.0741	.0741
88	.0008	.0008	.0008	.0434	.0434	.0434
89	.0002	.0002	.0002	.0193	.0193	.0193
90	.0000	.0000	.0000	.0000	.0000	.0000

$$\phi_c = 85°$$

$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
86	.0179	.0180	.0180	.3444	.3447	.3450
87	.0044	.0044	.0044	.1300	.1301	.1301
88	.0012	.0012	.0012	.0580	.0580	.0580
89	.0002	.0002	.0002	.0218	.0218	.0218
90	.0000	.0000	.0000	.0000	.0000	.0000

TABLE 2 - QUADRANT 3

Reference Point at $\phi = 180°$

$$\phi_c = 5°$$

φ°-180°	τ			σ		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
0	1.0000	1.0000	1.0000	.0000	.0000	.0000
1	1.0236	1.0477	1.0723	- 2.3475	- 2.3751	- 2.4031
2	1.0504	1.1026	1.1574	- 4.9698	- 5.0933	- 5.2208
3	1.0844	1.1740	1.2709	- 8.8637	- 8.6081	- 8.9652
4	1.1388	1.2911	1.4643	-13.4867	- 14.3374	- 15.3087

$$\phi_c = 10°$$

φ°-180°	τ			σ		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
0	1.0000	1.0000	1.0000	.0000	.0000	.0000
1	1.0059	1.0117	1.0175	- .5736	- .5753	- .5769
2	1.0123	1.0240	1.0359	- 1.1627	- 1.1695	- 1.1763
3	1.0193	1.0374	1.0559	- 1.7614	- 1.7373	- 1.8133
4	1.0272	1.0523	1.0780	- 2.4479	- 2.4778	- 2.5083
5	1.0364	1.0694	1.1034	- 3.1884	- 3.2392	- 3.2910
6	1.0475	1.0897	1.1337	- 4.0453	- 4.1270	- 4.2109
7	1.0616	1.1155	1.1722	- 5.0966	- 5.2262	- 5.3602
8	1.0815	1.1516	1.2263	- 6.5175	- 6.7293	- 6.9502
9	1.1158	1.2139	1.3206	- 8.8742	- 9.2660	- 9.6808

$$\phi_c = 15°$$

φ°-180°	τ			σ		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
0	1.0000	1.0000	1.0000	.0000	.0000	.0000
1	1.0027	1.0052	1.0077	- .2524	- .2527	- .2530
2	1.0057	1.0108	1.0159	- .5078	- .5091	- .5104
3	1.0091	1.0169	1.0247	- .7689	- .7718	- .7748
4	1.0129	1.0234	1.0341	-1.0384	- 1.0438	- 1.0492
5	1.0173	1.0307	1.0443	-1.3199	-1.3286	-1.3373
6	1.0232	1.0387	1.0555	-1.6175	-1.6305	-1.6437
7	1.0279	1.0478	1.0680	-1.9367	-1.9554	-1.9744
8	1.0346	1.0581	1.0822	-2.2851	-2.3112	-2.3376
9	1.0424	1.0702	1.0986	-2.6735	-2.7091	-2.7454
10	1.0520	1.0846	1.1182	-3.1186	-3.1670	-3.2165
11	1.0640	1.1025	1.1423	-3.6483	-3.7146	-3.7824
12	1.0799	1.1259	1.1739	-4.3156	-4.4081	-4.5032
13	1.1031	1.1599	1.2196	-5.2402	-5.3762	-5.5170
14	1.1444	1.2203	1.3012	-6.8133	-7.0420	-7.2309

Table 2

$\phi_c = 5°$

$\phi° - 180°$	ξ			η		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
0	.0000	.0000	.0000	.0000	.0000	.0000
1	2.3474	2.3749	2.4029	.0207	.0210	.0214
2	4.9687	5.0922	5.2197	.0900	.0929	.0960
3	8.2594	8.6005	8.9604	.2351	.2478	.2613
4	13.4124	14.3117	15.2915	.5549	.6027	.6551

$\phi_c = 10°$

$\phi° - 180°$	ξ			η		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
0	.0000	.0000	.0000	.0000	.0000	.0000
1	.5736	.5752	.5769	.0050	.0050	.0051
2	1.1625	1.1692	1.1760	.0205	.0206	.0208
3	1.7806	1.7964	1.8124	.0475	.0481	.0486
4	2.4458	2.4757	2.5061	.0883	.0897	.0912
5	3.1840	3.2347	3.2864	.1465	.1496	.1527
6	4.0369	4.1184	4.2020	.2289	.2349	.2412
7	5.0814	5.2105	5.3439	.3482	.3597	.3717
8	6.4900	6.7005	6.9201	.5345	.5568	.5801
9	8.8205	9.2090	9.6303	.8851	.9342	.9865

$\phi_c = 15°$

$\phi° - 180°$	ξ			η		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
0	.0000	.0000	.0000	.0000	.0000	.0000
1	.2524	.2527	.2530	.0022	.0022	.0022
2	.5077	.5090	.5103	.0089	.0089	.0090
3	.7685	.7714	.7744	.0203	.0204	.0205
4	1.0375	1.0429	1.0483	.0368	.0370	.0373
5	1.3181	1.3268	1.3356	.0589	.0594	.0599
6	1.6144	1.6274	1.6406	.0874	.0884	.0893
7	1.9315	1.9502	1.9691	.1236	.1252	.1268
8	2.2770	2.3029	2.3292	.1691	.1717	.1742
9	2.6611	2.6965	2.7325	.2266	.2306	.2346
10	3.1000	3.1481	3.1971	.3002	.3062	.3124
11	3.6209	3.6864	3.7535	.3968	.4062	.4157
12	4.2747	4.3659	4.4598	.5301	.5447	.5597
13	5.1773	5.3110	5.4493	.7308	.7548	.7797
14	6.7064	6.9303	7.1640	1.0995	1.1453	1.1933

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$\phi_c = 20°$

$\phi°-180°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
0	1.0000	1.0000	1.0000	.0000	.0000	.0000
1	1.0016	1.0030	1.0044	- .1404	- .1405	- .1406
2	1.0034	1.0063	1.0091	- .2818	- .2822	- .2826
3	1.0056	1.0099	1.0142	- .4250	- .4259	- .4268
4	1.0082	1.0140	1.0197	- .5709	- .5725	- .5741
5	1.0112	1.0184	1.0258	- .7203	- .7229	- .7255
6	1.0145	1.0234	1.0323	- .8745	- .8783	- .8821
7	1.0184	1.0289	1.0395	-1.0345	-1.0399	-1.0452
8	1.0228	1.0351	1.0474	-1.2020	-1.2092	-1.2165
9	1.0276	1.0419	1.0562	-1.3788	-1.3883	-1.3979
10	1.0336	1.0497	1.0660	-1.5672	-1.5795	-1.5918
11	1.0402	1.0585	1.0771	-1.7703	-1.7859	-1.8017
12	1.0479	1.0686	1.0897	-1.9921	-2.0118	-2.0318
13	1.0570	1.0804	1.1043	-2.2383	-2.2632	-2.2885
14	1.0680	1.0945	1.1216	-2.5174	-2.5489	-2.5808
15	1.0814	1.1115	1.1426	-2.8425	-2.8825	-2.9233
16	1.0984	1.1331	1.1690	-3.2358	-3.2876	-3.3404
17	1.1213	1.1620	1.2042	-3.7395	-3.8084	-3.8789
18	1.1550	1.2045	1.2561	-4.4504	-4.5474	-4.6472
19	1.2164	1.2818	1.3507	-5.6871	-5.8439	-6.0064

$\phi_c = 25°$

$\phi°-180°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
0	1.0000	1.0000	1.0000	.0000	.0000	.0000
1	1.0010	1.0019	1.0028	- .0887	- .0887	- .0887
2	1.0024	1.0042	1.0060	- .1777	- .1779	- .1780
3	1.0041	1.0067	1.0094	- .2675	- .2679	- .2683
4	1.0061	1.0097	1.0133	- .3584	- .3591	- .3597
5	1.0084	1.0130	1.0175	- .4508	- .4519	- .4529
6	1.0111	1.0166	1.0222	- .5451	- .5466	- .5481
7	1.0143	1.0208	1.0273	- .6417	- .6438	- .6458
8	1.0178	1.0253	1.0329	- .7412	- .7439	- .7467
9	1.0218	1.0304	1.0391	- .8440	- .8476	- .8512
10	1.0264	1.0361	1.0459	- .9510	- .9555	- .9601
11	1.0315	1.0424	1.0534	-1.0629	-1.0685	-1.0742
12	1.0373	1.0495	1.0618	-1.1807	-1.1876	-1.1946
13	1.0439	1.0574	1.0711	-1.3055	-1.3140	-1.3225
14	1.0514	1.0663	1.0815	-1.4389	-1.4492	-1.4596
15	1.0599	1.0765	1.0932	-1.5628	-1.5952	-1.6078
16	1.0698	1.0881	1.1067	-1.7398	-1.7548	-1.7699
17	1.0812	1.1015	1.1221	-1.9133	-1.9314	-1.9497
18	1.0947	1.1172	1.1402	-2.1082	-2.1302	-2.1524
19	1.1110	1.1361	1.1618	-2.3319	-2.3587	-2.3858
20	1.1310	1.1593	1.1883	-2.5957	-2.6287	-2.6624
21	1.1565	1.1889	1.2221	-2.9192	-2.9608	-3.0032
22	1.1912	1.2288	1.2677	-3.3396	-3.3938	-3.4491
23	1.2428	1.2885	1.3359	-3.9436	-4.0184	-4.0951
24	1.3384	1.3992	1.4628	-5.0199	-5.1391	-5.2619

Table 2

$\phi_c = 20°$

$\phi°$-180°	ξ			η		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
0	.0000	.0000	.0000	.0000	.0000	.0000
1	.1404	.1405	.1406	.0012	.0012	.0012
2	.2818	.2822	.2826	.0049	.0049	.0049
3	.4248	.4257	.4266	.0112	.0112	.0112
4	.5704	.5720	.5737	.0201	.0202	.0202
5	.7194	.7220	.7246	.0318	.0320	.0321
6	.8728	.8766	.8805	.0466	.0469	.0471
7	1.0318	1.0372	1.0425	.0647	.0652	.0656
8	1.1979	1.2051	1.2123	.0866	.0873	.0880
9	1.3728	1.3822	1.3917	.1127	.1138	.1148
10	1.5586	1.5707	1.5830	.1439	.1453	.1468
11	1.7582	1.7737	1.7893	.1809	.1830	.1851
12	1.9755	1.9950	2.0148	.2251	.2281	.2310
13	2.2159	2.2405	2.2654	.2785	.2825	.2866
14	2.4873	2.5182	2.5497	.3437	.3493	.3549
15	2.8020	2.8412	2.8812	.4252	.4329	.4408
16	3.1810	3.2315	3.2831	.5304	.5412	.5523
17	3.6639	3.7308	3.7993	.6738	.6894	.7055
18	4.3418	4.4355	4.5319	.8878	.9120	.9370
19	5.5141	5.6645	5.8203	1.2814	1.3247	1.3696

$\phi_c = 25°$

$\phi°$-180°	ξ			η		
	f = 0:01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
0	.0000	.0000	.0000	.0000	.0000	.0000
1	.0887	.0887	.0887	.0008	.0008	.0008
2	.1777	.1778	.1780	.0031	.0031	.0031
3	.2674	.2678	.2681	.0070	.0070	.0070
4	.3582	.3588	.3594	.0126	.0126	.0126
5	.4503	.4513	.4523	.0198	.0199	.0199
6	.5441	.5456	.5471	.0289	.0290	.0291
7	.6401	.6421	.6442	.0398	.0400	.0401
8	.7387	.7414	.7441	.0528	.0531	.0533
9	.8404	.8439	.8475	.0680	.0684	.0688
10	.9459	.9504	.9549	.0857	.0862	.0867
11	1.0559	1.0615	1.0671	.1061	.1068	.1076
12	1.1713	1.1782	1.1851	.1296	.1306	.1316
13	1.2932	1.3016	1.3100	.1566	.1579	.1593
14	1.4229	1.4330	1.4432	.1877	.1895	.1913
15	1.5622	1.5744	1.5867	.2238	.2261	.2284
16	1.7135	1.7282	1.7430	.2658	.2687	.2718
17	1.8798	1.8975	1.9153	.3151	.3189	.3228
18	2.0657	2.0870	2.1086	.3737	.3787	.3838
19	2.2778	2.3037	2.3300	.4447	.4513	.4579
20	2.5265	2.5583	2.5906	.5328	.5415	.5503
21	2.8294	2.8693	2.9098	.6462	.6579	.6698
22	3.2206	3.2720	3.3246	.8005	.8168	.8334
23	3.7784	3.8489	3.9213	1.0320	1.0561	1.0810
24	4.7650	4.8762	4.9908	1.4622	1.5041	1.5474

$$\phi_c = 30°$$

$\phi°-180°$	τ			σ		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
0	1.0000	1.0000	1.0000	.0000	.0000	.0000
1	1.0008	1.0014	1.0020	- .0605	- .0605	- .0605
2	1.0018	1.0030	1.0043	- .1212	- .1213	- .1214
3	1.0032	1.0050	1.0069	- .1823	- .1825	- .1826
4	1.0049	1.0074	1.0098	- .2439	- .2442	- .2445
5	1.0069	1.0100	1.0131	- .3063	- .3067	- .3072
6	1.0093	1.0130	1.0168	- .3695	- .3702	- .3709
7	1.0121	1.0165	1.0209	- .4339	- .4348	- .4358
8	1.0152	1.0203	1.0253	- .4996	- .5009	- .5021
9	1.0188	1.0245	1.0303	- .5670	- .5686	- .5702
10	1.0227	1.0292	1.0357	- .6362	- .6382	- .6402
11	1.0272	1.0344	1.0417	- .7076	- .7100	- .7126
12	1.0322	1.0402	1.0483	- .7815	- .7845	- .7876
13	1.0378	1.0466	1.0555	- .8584	- .8620	- .8657
14	1.0440	1.0537	1.0635	- .9387	- .9431	- .9475
15	1.0509	1.0616	1.0723	-1.0230	-1.0282	-1.0335
16	1.0587	1.0703	1.0820	-1.1121	-1.1182	-1.1244
17	1.0674	1.0801	1.0929	-1.2068	-1.2140	-1.2212
18	1.0772	1.0910	1.1050	-1.3080	-1.3165	-1.3250
19	1.0883	1.1034	1.1186	-1.4173	-1.4272	-1.4372
20	1.1010	1.1174	1.1341	-1.5362	-1.5479	-1.5596
21	1.1155	1.1335	1.1518	-1.6672	-1.6809	-1.6947
22	1.1325	1.1522	1.1724	-1.8135	-1.8296	-1.8459
23	1.1525	1.1743	1.1965	-1.9795	-1.9987	-2.0180
24	1.1766	1.2009	1.2256	-2.1721	-2.1950	-2.2183
25	1.2064	1.2337	1.2615	-2.4019	-2.4298	-2.4582
26	1.2448	1.2759	1.3077	-2.6874	-2.7221	-2.7574
27	1.2971	1.3335	1.3708	-3.0641	-3.1088	-3.1544
28	1.3762	1.4206	1.4665	-3.6156	-3.6769	-3.7396
29	1.5258	1.5861	1.6487	-4.6861	-4.7837	-4.8240

$\phi°-180°$	ξ			η		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
0	.0000	.0000	.0000	.0000	.0000	.0000
1	.0605	.0605	.0605	.0005	.0005	.0005
2	.1212	.1213	.1213	.0021	.0021	.0021
3	.1822	.1824	.1825	.0048	.0048	.0048
4	.2437	.2440	.2443	.0085	.0086	.0086
5	.3059	.3063	.3068	.0134	.0135	.0135
6	.3688	.3695	.3702	.0195	.0196	.0196
7	.4328	.4337	.4347	.0268	.0269	.0270
8	.4980	.4992	.5005	.0354	.0355	.0356
9	.5646	.5562	.5678	.0453	.0455	.0457
10	.6328	.6348	.6368	.0568	.0570	.0572
11	.7030	.7055	.7080	.0698	.0701	.0704
12	.7755	.7785	.7815	.0845	.0849	.0854
13	.8505	.8541	.8578	.1012	.1017	.1023
14	.9286	.9329	.9373	.1199	.1207	.1214
15	1.0103	1.0154	1.0205	.1410	.1420	.1429
16	1.0961	1.1021	1.1082	.1649	.1660	.1672
17	1.1868	1.1939	1.2010	.1917	.1932	.1947
18	1.2834	1.2916	1.2999	.2222	.2241	.2260
19	1.3870	1.3966	1.4063	.2569	.2592	.2616
20	1.4992	1.5104	1.5217	.2966	.2995	.3024
21	1.6219	1.6350	1.6482	.3425	.3461	.3498
22	1.7579	1.7733	1.7889	.3961	.4006	.4052
23	1.9113	1.9295	1.9479	.4597	.4654	.4711
24	2.0879	2.1096	2.1315	.5365	.5437	.5510
25	2.2970	2.3233	2.3498	.6319	.6411	.6505
26	2.5546	2.5868	2.6198	.7549	.7670	.7795
27	2.8917	2.9328	2.9750	.9231	.9398	.9567
28	3.3807	3.4366	3.4939	1.1781	1.2024	1.2273
29	4.2681	4.3560	4.4463	1.6612	1.7029	1.7459

$$\phi_c = 35°$$

$\phi° - 180°$	τ			σ		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
0	1.0000	1.0000	1.0000	.0000	.0000	.0000
1	1.0006	1.0010	1.0015	- .0435	- .0435	- .0435
2	1.0015	1.0024	1.0032	- .0871	- .0871	- .0872
3	1.0027	1.0040	1.0053	- .1309	- .1310	- .1310
4	1.0042	1.0060	1.0077	- .1750	- .1751	- .1753
5	1.0061	1.0083	1.0105	- .2195	- .2197	- .2200
6	1.0082	1.0109	1.0136	- .2645	- .2648	- .2652
7	1.0108	1.0139	1.0170	- .3101	- .3106	- .3111
8	1.0137	1.0173	1.0209	- .3565	- .3571	- .3577
9	1.0169	1.0210	1.0251	- .4037	- .4045	- .4053
10	1.0206	1.0252	1.0298	- .4519	- .4529	- .4539
11	1.0247	1.0298	1.0350	- .5012	- .5025	- .5037
12	1.0293	1.0349	1.0406	- .5519	- .5534	- .5549
13	1.0343	1.0405	1.0468	- .6041	- .6059	- .6077
14	1.0399	1.0467	1.0535	- .6579	- .6601	- .6623
15	1.0461	1.0535	1.0609	- .7138	- .7163	- .7188
16	1.0529	1.0609	1.0690	- .7718	- .7748	- .7777
17	1.0604	1.0691	1.0779	- .8324	- .8358	- .8393
18	1.0687	1.0781	1.0876	- .8959	- .8999	- .9039
19	1.0779	1.0881	1.0983	- .9628	- .9674	- .9720
20	1.0881	1.0991	1.1102	-1.0336	-1.0388	-1.0442
21	1.0995	1.1113	1.1233	-1.1089	-1.1149	-1.1210
22	1.1122	1.1250	1.1379	-1.1896	-1.1965	-1.2035
23	1.1264	1.1403	1.1543	-1.2766	-1.2846	-1.2926
24	1.1425	1.1575	1.1727	-1.3712	-1.3804	-1.3897
25	1.1609	1.1772	1.1937	-1.4752	-1.4858	-1.4965
26	1.1820	1.1998	1.2179	-1.5907	-1.6030	-1.6154
27	1.2066	1.2261	1.2460	-1.7208	-1.7351	-1.7496
28	1.2358	1.2573	1.2792	-1.8700	-1.8868	-1.9039
29	1.2711	1.2950	1.3194	-2.0450	-2.0649	-2.0852
30	1.3150	1.3420	1.3695	-2.2562	-2.2804	-2.3049
31	1.3720	1.4028	1.4344	-2.5223	-2.5522	-2.5825
32	1.4505	1.4869	1.5242	-2.8793	-2.9176	-2.9567
33	1.5711	1.6163	1.6627	-3.4130	-3.4657	-3.5195
34	1.8054	1.8685	1.9337	-4.4226	-4.5076	-4.5946

$\phi°-180°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
0	.0000	.0000	.0000	.0000	.0000	.0000
1	.0435	.0435	.0435	.0004	.0004	.0004
2	.0871	.0871	.0871	.0015	.0015	.0015
3	.1308	.1309	.1310	.0034	.0034	.0034
4	.1748	.1750	.1751	.0061	.0061	.0061
5	.2192	.2194	.2197	.0096	.0096	.0096
6	.2640	.2643	.2647	.0139	.0140	.0140
7	.3093	.3098	.3103	.0191	.0191	.0192
8	.3553	.3559	.3565	.0251	.0252	.0253
9	.4020	.4028	.4036	.0321	.0322	.0323
10	.4495	.4505	.4515	.0401	.0402	.0403
11	.4980	.4993	.5005	.0491	.0492	.0494
12	.5477	.5492	.5507	.0592	.0594	.0596
13	.5986	.6004	.6022	.0705	.0708	.0710
14	.6510	.6531	.6553	.0831	.0834	.0838
15	.7050	.7075	.7100	.0970	.0975	.0979
16	.7610	.7639	.7668	.1126	.1131	.1137
17	.8191	.8224	.8258	.1298	.1305	.1312
18	.8797	.8835	.8874	.1489	.1497	.1506
19	.9431	.9475	.9520	.1701	.1712	.1722
20	1.0098	1.0149	1.0200	.1937	.1950	.1963
21	1.0803	1.0862	1.0920	.2201	.2217	.2232
22	1.1554	1.1620	1.1688	.2497	.2516	.2535
23	1.2358	1.2434	1.2511	.2830	.2853	.2876
24	1.3225	1.3313	1.3401	.3207	.3235	.3263
25	1.4171	1.4271	1.4372	.3639	.3672	.3706
26	1.5214	1.5329	1.5445	.4136	.4177	.4218
27	1.6378	1.6512	1.6647	.4717	.4767	.4817
28	1.7702	1.7857	1.8015	.5406	.5468	.5530
29	1.9239	1.9422	1.9608	.6241	.6318	.6395
30	2.1077	2.1297	2.1520	.7282	.7379	.7478
31	2.3369	2.3638	2.3912	.8633	.8760	.8888
32	2.6412	2.6754	2.7101	1.0500	1.0671	1.0844
33	3.0911	3.1374	3.1846	1.3371	1.3619	1.3872
34	3.9324	4.0055	4.0803	1.8953	1.9379	1.9816

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$\phi°-180°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
0	1.0000	1.0000	1.0000	.0000	.0000	.0000
1	1.0005	1.0008	1.0011	- .0324	- .0324	- .0324
2	1.0013	1.0019	1.0026	- .0648	- .0648	- .0649
3	1.0024	1.0033	1.0043	- .0974	- .0974	- .0975
4	1.0038	1.0051	1.0064	- .1301	- .1302	- .1303
5	1.0055	1.0071	1.0088	- .1631	- .1632	- .1634
6	1.0075	1.0095	1.0115	- .1964	- .1966	- .1968
7	1.0099	1.0122	1.0146	- .2301	- .2303	- .2306
8	1.0127	1.0153	1.0180	- .2642	- .2645	- .2649
9	1.0158	1.0188	1.0218	- .2988	- .2992	- .2997
10	1.0193	1.0226	1.0260	- .3339	- .3345	- .3351
11	1.0231	1.0269	1.0307	- .3698	- .3705	- .3712
12	1.0274	1.0316	1.0358	- .4064	- .4072	- .4081
13	1.0322	1.0367	1.0413	- .4439	- .4449	- .4459
14	1.0374	1.0424	1.0473	- .4823	- .4835	- .4846
15	1.0432	1.0485	1.0539	- .5218	- .5232	- .5245
16	1.0494	1.0553	1.0611	- .5626	- .5641	- .5657
17	1.0563	1.0626	1.0689	- .6047	- .6065	- .6083
18	1.0638	1.0706	1.0774	- .6483	- .6504	- .6525
19	1.0720	1.0793	1.0866	- .6937	- .6961	- .6985
20	1.0810	1.0889	1.0967	- .7410	- .7437	- .7465
21	1.0909	1.0993	1.1077	- .7906	- .7937	- .7968
22	1.1017	1.1107	1.1198	- .8427	- .8461	- .8497
23	1.1136	1.1233	1.1330	- .8976	- .9016	- .9055
24	1.1267	1.1371	1.1475	- .9559	- .9603	- .9649
25	1.1412	1.1524	1.1636	-1.0180	-1.0230	-1.0281
26	1.1574	1.1693	1.1814	-1.0845	-1.0903	-1.0960
27	1.1754	1.1882	1.2013	-1.1563	-1.1628	-1.1694
28	1.1956	1.2095	1.2235	-1.2344	-1.2417	-1.2492
29	1.2185	1.2335	1.2487	-1.3199	-1.3283	-1.3368
30	1.2446	1.2609	1.2775	-1.4147	-1.4243	-1.4340
31	1.2747	1.2925	1.3106	-1.5209	-1.5320	-1.5431
32	1.3100	1.3295	1.3494	-1.6417	-1.6545	-1.6675
33	1.3520	1.3736	1.3956	-1.7817	-1.7967	-1.8118
34	1.4030	1.4272	1.4518	-1.9476	-1.9653	-1.9833
35	1.4671	1.4945	1.5224	-2.1506	-2.1720	-2.1936
36	1.5510	1.5827	1.6150	-2.4101	-2.4365	-2.4633
37	1.6684	1.7062	1.7448	-2.7645	-2.7986	-2.8331
38	1.8521	1.8999	1.9490	-3.3072	-3.3544	-3.4025
39	2.2209	2.2902	2.3617	-4.3721	-4.4498	-4.5292

$\phi°-180°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
0	.0000	.0000	.0000	.0000	.0000	.0000
1	.0324	.0324	.0324	.0003	.0003	.0003
2	.0648	.0648	.0648	.0011	.0011	.0011
3	.0973	.0974	.0974	.0026	.0026	.0026
4	.1300	.1301	.1302	.0046	.0046	.0046
5	.1629	.1630	.1632	.0071	.0071	.0072
6	.1960	.1962	.1964	.0103	.0103	.0104
7	.2295	.2297	.2300	.0141	.0142	.0142
8	.2633	.2636	.2640	.0186	.0186	.0187
9	.2975	.2980	.2984	.0237	.0238	.0238
10	.3322	.3328	.3333	.0295	.0296	.0297
11	.3675	.3681	.3688	.0361	.0361	.0362
12	.4033	.4042	.4050	.0434	.0435	.0436
13	.4399	.4409	.4419	.0515	.0516	.0518
14	.4773	.4784	.4796	.0604	.0606	.0608
15	.5156	.5169	.5182	.0703	.0706	.0708
16	.5548	.5563	.5579	.0812	.0815	.0818
17	.5952	.5969	.5987	.0932	.0935	.0939
18	.6368	.6388	.6409	.1063	.1068	.1072
19	.6798	.6821	.6845	.1207	.1212	.1218
20	.7244	.7271	.7297	.1365	.1372	.1378
21	.7709	.7738	.7768	.1539	.1546	.1554
22	.8193	.8227	.8260	.1730	.1739	.1748
23	.8701	.8739	.8777	.1940	.1951	.1962
24	.9235	.9278	.9320	.2172	.2185	.2199
25	.9800	.9848	.9896	.2430	.2445	.2461
26	1.0401	1.0455	1.0509	.2716	.2735	.2754
27	1.1043	1.1104	1.1165	.3037	.3059	.3081
28	1.1735	1.1804	1.1873	.3397	.3423	.3450
29	1.2487	1.2565	1.2643	.3806	.3837	.3868
30	1.3312	1.3400	1.3489	.4272	.4309	.4347
31	1.4227	1.4328	1.4429	.4812	.4856	.4901
32	1.5257	1.5373	1.5489	.5443	.5496	.5550
33	1.6437	1.6571	1.6706	.6195	.6260	.6326
34	1.7821	1.7977	1.8136	.7112	.7192	.7273
35	1.9493	1.9680	1.9869	.8262	.8363	.8465
36	2.1605	2.1833	2.2064	.9769	.9900	1.0032
37	2.4453	2.4742	2.5036	1.1879	1.2055	1.2233
38	2.8756	2.9149	2.9550	1.5186	1.5441	1.5702
39	3.7082	3.7713	3.8359	2.1825	2.2271	2.2727

$\phi°-180°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
0	1.0000	1.0000	1.0000	.0000	.0000	.0000
1	1.0004	1.0006	1.0009	- .0247	- .0247	- .0247
2	1.0011	1.0016	1.0021	- .0494	- .0494	- .0495
3	1.0021	1.0029	1.0036	- .0742	- .0743	- .0743
4	1.0034	1.0044	1.0054	- .0992	- .0992	- .0993
5	1.0051	1.0063	1.0076	- .1243	- .1243	- .1244
6	1.0071	1.0086	1.0101	- .1495	- .1496	- .1498
7	1.0094	1.0111	1.0129	- .1750	- .1752	- .1754
8	1.0120	1.0140	1.0160	- .2008	- .2010	- .2012
9	1.0150	1.0173	1.0196	- .2269	- .2272	- .2275
10	1.0183	1.0209	1.0235	- .2534	- .2537	- .2541
11	1.0221	1.0249	1.0278	- .2803	- .2807	- .2811
12	1.0262	1.0293	1.0325	- .3077	- .3082	- .3086
13	1.0308	1.0342	1.0376	- .3356	- .3361	- .3367
14	1.0357	1.0395	1.0432	- .3641	- .3647	- .3654
15	1.0412	1.0452	1.0493	- .3932	- .3940	- .3948
16	1.0471	1.0515	1.0559	- .4231	- .4240	- .4249
17	1.0536	1.0583	1.0630	- .4538	- .4548	- .4558
18	1.0606	1.0657	1.0708	- .4854	- .4866	- .4877
19	1.0683	1.0737	1.0791	- .5180	- .5193	- .5206
20	1.0766	1.0824	1.0882	- .5517	- .5532	- .5547
21	1.0856	1.0918	1.0980	- .5867	- .5884	- .5901
22	1.0954	1.1020	1.1087	- .6230	- .6249	- .6269
23	1.1060	1.1131	1.1202	- .6609	- .6631	- .6652
24	1.1176	1.1251	1.1327	- .7006	- .7030	- .7054
25	1.1302	1.1383	1.1464	- .7422	- .7449	- .7476
26	1.1440	1.1526	1.1613	- .7860	- .7890	- .7921
27	1.1591	1.1683	1.1775	- .8324	- .8357	- .8391
28	1.1757	1.1855	1.1954	- .8816	- .8854	- .8892
29	1.1939	1.2044	1.2150	- .9341	- .9383	- .9426
30	1.2141	1.2253	1.2367	- .9905	- .9952	-1.0000
31	1.2365	1.2486	1.2608	-1.0513	-1.0566	-1.0620
32	1.2616	1.2746	1.2878	-1.1174	-1.1234	-1.1294
33	1.2899	1.3039	1.3181	-1.1898	-1.1966	-1.2034
34	1.3219	1.3371	1.3525	-1.2698	-1.2775	-1.2852
35	1.3586	1.3751	1.3919	-1.3592	-1.3679	-1.3766
36	1.4011	1.4192	1.4375	-1.4603	-1.4702	-1.4803
37	1.4511	1.4710	1.4913	-1.5763	-1.5879	-1.5995
38	1.5110	1.5332	1.5557	-1.7123	-1.7257	-1.7393
39	1.5845	1.6094	1.6347	-1.8754	-1.8913	-1.9074
40	1.6775	1.7060	1.7350	-2.0777	-2.0970	-2.1164
41	1.8009	1.8343	1.8683	-2.3406	-2.3645	-2.3887
42	1.9763	2.0168	2.0582	-2.7068	-2.7379	-2.7694
43	2.2574	2.3100	2.3638	-3.2828	-3.3265	-3.3709
44	2.8435	2.9233	3.0053	-4.4611	-4.5351	-4.6107

$\phi°-180°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
0	.0000	.0000	.0000	.0000	.0000	.0000
1	.0247	.0247	.0247	.0002	.0002	.0002
2	.0494	.0494	.0494	.0009	.0009	.0009
3	.0742	.0742	.0743	.0019	.0019	.0019
4	.0991	.0991	.0992	.0035	.0035	.0035
5	.1241	.1242	.1242	.0054	.0054	.0054
6	.1493	.1494	.1495	.0079	.0079	.0079
7	.1746	.1748	.1749	.0107	.0108	.0108
8	.2002	.2004	.2006	.0141	.0141	.0141
9	.2260	.2263	.2265	.0180	.0180	.0180
10	.2521	.2524	.2527	.0223	.0224	.0224
11	.2786	.2789	.2793	.0272	.0273	.0273
12	.3054	.3058	.3063	.0327	.0328	.0328
13	.3326	.3332	.3337	.0387	.0388	.0389
14	.3603	.3610	.3616	.0454	.0455	.0456
15	.3885	.3893	.3900	.0527	.0528	.0530
16	.4173	.4182	.4191	.0607	.0608	.0610
17	.4467	.4477	.4487	.0694	.0696	.0698
18	.4769	.4780	.4792	.0789	.0791	.0794
19	.5078	.5091	.5104	.0892	.0895	.0898
20	.5396	.5410	.5425	.1005	.1009	.1012
21	.5723	.5740	.5756	.1127	.1132	.1136
22	.6062	.6080	.6098	.1261	.1266	.1271
23	.6412	.6432	.6453	.1406	.1412	.1418
24	.6775	.6798	.6821	.1564	.1571	.1578
25	.7154	.7179	.7205	.1737	.1745	.1753
26	.7550	.7578	.7607	.1925	.1935	.1944
27	.7964	.7996	.8028	.2132	.2143	.2154
28	.8401	.8436	.8471	.2359	.2372	.2386
29	.8863	.8902	.8941	.2610	.2625	.2641
30	.9353	.9396	.9440	.2888	.2905	.2923
31	.9877	.9926	.9975	.3196	.3217	.3238
32	1.0441	1.0495	1.0549	.3542	.3566	.3590
33	1.1051	1.1112	1.1173	.3931	.3959	.3988
34	1.1718	1.1786	1.1855	.4373	.4406	.4439
35	1.2455	1.2531	1.2609	.4879	.4918	.4958
36	1.3277	1.3364	1.3452	.5466	.5513	.5559
37	1.4210	1.4310	1.4411	.6157	.6213	.6269
38	1.5289	1.5403	1.5520	.6985	.7052	.7120
39	1.6565	1.6699	1.6835	.8000	.8083	.8167
40	1.8126	1.8286	1.8447	.9288	.9392	.9497
41	2.0123	2.0319	2.0517	1.0996	1.1130	1.1266
42	2.2865	2.3114	2.3367	1.3424	1.3606	1.3791
43	2.7108	2.7450	2.7798	1.7318	1.7585	1.7857
44	3.5645	3.6207	3.6780	2.5440	2.5917	2.6404

$$\phi_c = 50°$$

$\phi°-180°$	τ			ε		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
0	1.0000	1.0000	1.0000	.0000	.0000	.0000
1	1.0003	1.0005	1.0007	- .0191	- .0191	- .0191
2	1.0010	1.0014	1.0018	- .0383	- .0383	- .0383
3	1.0019	1.0025	1.0031	- .0575	- .0575	- .0575
4	1.0032	1.0040	1.0048	- .0768	- .0768	- .0768
5	1.0048	1.0058	1.0067	- .0961	- .0962	- .0962
6	1.0067	1.0079	1.0090	- .1157	- .1157	- .1158
7	1.0089	1.0103	1.0117	- .1353	- .1354	- .1355
8	1.0115	1.0131	1.0146	- .1552	- .1553	- .1554
9	1.0144	1.0162	1.0179	- .1753	- .1754	- .1756
10	1.0177	1.0196	1.0216	- ?56	- .1958	- .1959
11	1.0213	1.0235	1.0257	61	- .2164	- .2166
12	1.0253	1.0277	1.0301	70	- .2373	- .2376
13	1.0297	1.0324	1.0350	↘83	- .2586	- .2589
14	1.0345	1.0374	1.0403	799	- .2805	- .2807
15	1.0398	1.0429	1.0460	- .3019	- .3024	- .3028
16	1.0455	1.0489	1.0522	- .3245	- .3250	- .3255
17	1.0517	1.0553	1.0589	- .3475	- .3481	- .3487
18	1.0584	1.0623	1.0662	- .3711	- .3718	- .3725
19	1.0657	1.0698	1.0740	- .3953	- .3961	- .3969
20	1.0735	1.0780	1.0824	- .4202	- .4211	- .4220
21	1.0820	1.0867	1.0914	- .4459	- .4469	- .4479
22	1.0912	1.0962	1.1012	- .4724	- .4735	- .4746
23	1.1010	1.10<4	1.1117	- .4999	- .5011	- .5024
24	1.1117	1.11\3	1.1230	- .5284	- .5297	- .5311
25	1.1232	1.1292	1.1353	- .5580	- .5595	- .5610
26	1.1356	1.1420	1.1485	- .5888	- .5905	- .5922
27	1.1491	1.1559	1.1628	- .6211	- .6230	- .6249
28	1.1637	1.1709	1.1782	- .6550	- .6570	- .6591
29	1.1796	1.1873	1.1950	- .6905	- .6929	- .6952
30	1.1968	1.2050	1.2133	- .7281	- .7307	- .7332
31	1.2157	1.2244	1.2332	- .7679	- .7707	- .7736
32	1.2363	1.2456	1.2550	- .8103	- .8134	- .8166
33	1.2589	1.2689	1.2789	- .8555	- .8590	- .8625
34	1.2839	1.2946	1.3053	- .9041	- .9080	- .9119
35	1.3116	1.3230	1.3345	- .9566	- .9609	- .9653
36	1.3424	1.3547	1.3670	-1.0137	-1.0185	-1.0234
37	1.3770	1.3902	1.4035	-1.0761	-1.0816	-1.0870
38	1.4160	1.4303	1.4447	-1.1451	-1.1512	-1.1573
39	1.4604	1.4759	1.4916	-1.2219	-1.2288	-1.2357
40	1.5115	1.5285	1.5456	-1.3084	-1.3163	-1.3242
41	1.5711	1.5898	1.6086	-1.4072	-1.4162	-1.4253
42	1.6417	1.6623	1.6833	-1.5219	-1.5323	-1.5428
43	1.7268	1.7500	1.7734	-1.6578	-1.6699	-1.6822
44	1.8323	1.8586	1.8852	-1.8229	-1.8373	-1.8519
45	1.9674	1.9978	2.0287	-2.0308	-2.0483	-2.0660
46	2.1492	2.1853	2.2220	-2.3056	-2.3276	-2.3498
47	2.4125	2.4573	2.5029	-2.6970	-2.7259	-2.7552
48	2.8458	2.9056	2.9667	-3.3309	-3.3724	-3.4145
49	3.7894	3.8851	3.9831	-4.6895	-4.7625	-4.8369

92

$\phi°-180°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
0	.0000	.0000	.0000	.0000	.0000	.0000
1	.0191	.0191	.0191	.0002	.0002	.0002
2	.0383	.0383	.0383	.0007	.0007	.0007
3	.0575	.0575	.0575	.0015	.0015	.0015
4	.0767	.0767	.0768	.0027	.0027	.0027
5	.0960	.0961	.0961	.0042	.0042	.0042
6	.1154	.1155	.1156	.0061	.0061	.0061
7	.1350	.1351	.1352	.0083	.0083	.0083
8	.1547	.1548	.1549	.0109	.0109	.0109
9	.1745	.1747	.1748	.0139	.0139	.0139
10	.1946	.1947	.1949	.0172	.0172	.0173
11	.2148	.2150	.2152	.0210	.0210	.0210
12	.2353	.2355	.2358	.0251	.0252	.0252
13	.2560	.2563	.2566	.0297	.0298	.0298
14	.2770	.2774	.2778	.0348	.0348	.0349
15	.2984	.2988	.2992	.0403	.0404	.0405
16	.3201	.3206	.3211	.0463	.0464	.0465
17	.3421	.3427	.3433	.0528	.0530	.0531
18	.3647	.3653	.3660	.0599	.0601	.0602
19	.3876	.3884	.3891	.0676	.0678	.0680
20	.4111	.4120	.4128	.0760	.0762	.0764
21	.4352	.4361	.4371	.0849	.0852	.0854
22	.4599	.4609	.4620	.0947	.0950	.0953
23	.4852	.4864	.4876	.1052	.1055	.1059
24	.5113	.5126	.5139	.1165	.1169	.1173
25	.5383	.5397	.5412	.1288	.1293	.1297
26	.5661	.5677	.5693	.1421	.1426	.1432
27	.5950	.5968	.5985	.1565	.1571	.1577
28	.6250	.6269	.6289	.1721	.1728	.1736
29	.6563	.6584	.6606	.1891	.1899	.1908
30	.6890	.6913	.6937	.2076	.2085	.2095
31	.7233	.7285	.7285	.2278	.2289	.2300
32	.7594	.7622	.7651	.2499	.2512	.2525
33	.7975	.8007	.8039	.2743	.2757	.2771
34	.8381	.8416	.8451	.3011	.3027	.3044
35	.8813	.8852	.8891	.3308	.3327	.3347
36	.9278	.9320	.9363	.3640	.3662	.3684
37	.9780	.9827	.9875	.4011	.4037	.4063
38	1.0327	1.0379	1.0433	.4431	.4461	.4491
39	1.0928	1.0987	1.1046	.4909	.4944	.4979
40	1.1595	1.1662	1.1729	.5460	.5500	.5541
41	1.2347	1.2422	1.2497	.6102	.6150	.6198
42	1.3205	1.3291	1.3377	.6862	.6919	.6977
43	1.4207	1.4305	1.4405	.7780	.7849	.7919
44	1.5404	1.5519	1.5635	.8917	.9002	.9088
45	1.6886	1.7023	1.7162	1.0374	1.0481	1.0589
46	1.8811	1.8980	1.9150	1.2335	1.2474	1.2614
47	2.1504	2.1720	2.1939	1.5177	1.5365	1.5556
48	2.5783	2.6084	2.6389	1.9853	2.0135	2.0421
49	3.4771	3.5280	3.5799	3.0041	3.0559	3.1087

$\phi°-180°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
0	1.0000	1.0000	1.0000	.0000	.0000	.0000
1	1.0003	1.0005	1.0006	- .0149	- .0149	- .0149
2	1.0009	1.0012	1.0015	- .0299	- .0299	- .0299
3	1.0018	1.0023	1.0027	- .0448	- .0449	- .0449
4	1.0030	1.0036	1.0042	- .0599	- .0599	- .0599
5	1.0046	1.0053	1.0061	- .0750	- .0750	- .0750
6	1.0064	1.0073	1.0083	- .0902	- .0902	- .0902
7	1.0086	1.0097	1.0107	- .1055	- .1055	- .1056
8	1.0111	1.0123	1.0136	- .1209	- .1210	- .1210
9	1.0140	1.0154	1.0167	- .1365	- .1365	- .1366
10	1.0172	1.0187	1.0203	- .1522	- .1523	- .1524
11	1.0207	1.0224	1.0241	- .1681	- .1682	- .1684
12	1.0246	1.0265	1.0284	- .1842	- .1844	- .1846
13	1.0290	1.0310	1.0331	- .2006	- .2008	- .2010
14	1.0337	1.0359	1.0381	- .2172	- .2175	- .2177
15	1.0388	1.0412	1.0436	- .2341	- .2344	- .2347
16	1.0443	1.0469	1.0495	- .2513	- .2517	- .2520
17	1.0503	1.0531	1.0559	- .2689	- .2693	- .2696
18	1.0568	1.0598	1.0628	- .2868	- .2872	- .2876
19	1.0638	1.0670	1.0702	- .3052	- .3056	- .3061
20	1.0714	1.0748	1.0782	- .3240	- .3245	- .3250
21	1.0795	1.0831	1.0867	- .3433	- .3438	- .3444
22	1.0882	1.0920	1.0959	- .3631	- .3637	- .3644
23	1.0975	1.1016	1.1057	- .3835	- .3842	- .3850
24	1.1075	1.1119	1.1162	- .4046	- .4054	- .4062
25	1.1183	1.1229	1.1275	- .4263	- .4272	- .4281
26	1.1299	1.1348	1.1396	- .4489	- .4498	- .4508
27	1.1423	1.1475	1.1527	- .4723	- .4733	- .4744
28	1.1557	1.1612	1.1667	- .4966	- .4978	- .4990
29	1.1701	1.1759	1.1817	- .5219	- .5233	- .5246
30	1.1857	1.1918	1.1980	- .5484	- .5499	- .5514
31	1.2024	1.2089	1.2155	- .5762	- .5778	- .5794
32	1.2206	1.2275	1.2344	- .6054	- .6072	- .6089
33	1.2402	1.2475	1.2549	- .6362	- .6381	- .6401
34	1.2616	1.2693	1.2772	- .6687	- .6709	- .6730
35	1.2848	1.2931	1.3014	- .7033	- .7056	- .7080
36	1.3102	1.3190	1.3279	- .7401	- .7427	- .7453
37	1.3380	1.3474	1.3569	- .7795	- .7824	- .7852
38	1.3686	1.3786	1.3888	- .8219	- .8250	- .8282
39	1.4024	1.4132	1.4240	- .8677	- .8712	- .8747
40	1.4400	1.4515	1.4632	- .9175	- .9214	- .9253
41	1.4820	1.4944	1.5070	- .9720	- .9764	- .9807
42	1.5292	1.5427	1.5562	-1.0321	-1.0370	-1.0419
43	1.5827	1.5974	1.6121	-1.0990	-1.1045	-1.1100
44	1.6440	1.6600	1.6761	-1.1742	-1.1804	-1.1866

Table 2

$\phi°-180°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
0	.0000	.0000	.0000	.0000	.0000	.0000
1	.0149	.0149	.0149	.0001	.0001	.0001
2	.0299	.0299	.0299	.0005	.0005	.0005
3	.0448	.0448	.0448	.0012	.0012	.0012
4	.0598	.0598	.0599	.0021	.0021	.0021
5	.0749	.0749	.0749	.0033	.0033	.0033
6	.0900	.0900	.0901	.0047	.0047	.0047
7	.1052	.1053	.1053	.0065	.0065	.0065
8	.1205	.1206	.1206	.0085	.0085	.0085
9	.1359	.1360	.1361	.0108	.0108	.0108
10	.1514	.1515	.1516	.0134	.0134	.0134
11	.1671	.1672	.1673	.0163	.0163	.0163
12	.1829	.1830	.1832	.0195	.0195	.0195
13	.1988	.1990	.1992	.0230	.0231	.0231
14	.2150	.2152	.2155	.0269	.0270	.0270
15	.2314	.2316	.2319	.0312	.0312	.0312
16	.2480	.2483	.2486	.0358	.0358	.0359
17	.2648	.2651	.2655	.0407	.0408	.0409
18	.2819	.2823	.2827	.0461	.0462	.0463
19	.2993	.2997	.3002	.0520	.0521	.0522
20	.3170	.3175	.3180	.0582	.0584	.0585
21	.3351	.3356	.3362	.0650	.0651	.0653
22	.3535	.3541	.3548	.0722	.0724	.0726
23	.3724	.3731	.3738	.0801	.0803	.0805
24	.3917	.3925	.3932	.0885	.0887	.0889
25	.4115	.4123	.4132	.0975	.0978	.0980
26	.4318	.4328	.4337	.1072	.1075	.1078
27	.4528	.4538	.4548	.1176	.1180	.1183
28	.4743	.4755	.4766	.1289	.1293	.1297
29	.4966	.4979	.4991	.1410	.1414	.1419
30	.5197	.5210	.5224	.1540	.1545	.1551
31	.5436	.5451	.5466	.1681	.1687	.1693
32	.5685	.5701	.5717	.1834	.1841	.1847
33	.5944	.5962	.5980	.1999	.2007	.2015
34	.6216	.6235	.6255	.2179	.2188	.2197
35	.6501	.6522	.6543	.2374	.2385	.2395
36	.6800	.6823	.6846	.2588	.2600	.2611
37	.7117	.7142	.7168	.2822	.2836	.2849
38	.7453	.7481	.7509	.3080	.3096	.3111
39	.7811	.7842	.7872	.3366	.3383	.3400
40	.8196	.8229	.8263	.3683	.3702	.3722
41	.8610	.8647	.8684	.4037	.4059	.4082
42	.9061	.9101	.9142	.4435	.4461	.4487
43	.9554	.9599	.9644	.4887	.4917	.4948
44	1.0099	1.0149	1.0200	.5405	.5440	.5475

$\phi_c = 55°$ (continued)

$\phi°-180°$	τ			σ		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
45	1.7150	1.7325	1.7502	-1.2597	-1.2667	-1.2738
46	1.7982	1.8176	1.8372	-1.3582	-1.3663	-1.3745
47	1.8976	1.9192	1.9411	-1.4739	-1.4833	-1.4927
48	2.0185	2.0430	2.0678	-1.6125	-1.6235	-1.6346
49	2.1700	2.1981	2.2266	-1.7834	-1.7965	-1.8098
50	2.3666	2.3996	2.4331	-2.0019	-2.0180	-2.0342
51	2.6354	2.6753	2.7158	-2.2963	-2.3166	-2.3372
52	3.0330	3.0836	3.1350	-2.7257	-2.7529	-2.7804
53	3.7068	3.7767	3.8479	-3.4435	-3.4834	-3.5240
54	5.2466	5.3651	5.4863	-5.0619	-5.1355	-5.2105

$\phi_c = 60°$

$\phi°-180°$	τ			σ		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
0	1.0000	1.0000	1.0000	.0000	.0000	.0000
1	1.0003	1.0004	1.0005	- .0116	- .0116	- .0116
2	1.0008	1.0011	1.0013	- .0233	- .0233	- .0233
3	1.0017	1.0021	1.0024	- .0350	- .0350	- .0350
4	1.0029	1.0034	1.0038	- .0467	- .0467	- .0467
5	1.0044	1.0050	1.0056	- .0584	- .0585	- .0585
6	1.0062	1.0069	1.0076	- .0703	- .0703	- .0703
7	1.0084	1.0092	1.0100	- .0822	- .0822	- .0822
8	1.0108	1.0118	1.0127	- .0942	- .0942	- .0942
9	1.0136	1.0147	1.0158	- .1062	- .1063	- .1064
10	1.0166	1.0180	1.0192	- .1184	- .1185	- .1186
11	1.0203	1.0216	1.0229	- .1308	- .1309	- .1309
12	1.0241	1.0256	1.0270	- .1432	- .1433	- .1435
13	1.0284	1.0300	1.0315	- .1559	- .1560	- .1561
14	1.0330	1.0347	1.0364	- .1687	- .1688	- .1690
15	1.0380	1.0399	1.0417	- .1817	- .1819	- .1820
16	1.0434	1.0454	1.0474	- .1949	- .1951	- .1953
17	1.0493	1.0514	1.0536	- .2084	- .2086	- .2088
18	1.0556	1.0579	1.0602	- .2221	- .2223	- .2226
19	1.0624	1.0649	1.0673	- .2361	- .2363	- .2366
20	1.0697	1.0723	1.0749	- .2503	- .2507	- .2510
21	1.0775	1.0803	1.0831	- .2650	- .2653	- .2657
22	1.0859	1.0889	1.0918	- .2799	- .2803	- .2807
23	1.0949	1.0980	1.1012	- .2953	- .2957	- .2961
24	1.1045	1.1078	1.1111	- .3111	- .3115	- .3120
25	1.1147	1.1182	1.1218	- .3273	- .3278	- .3283
26	1.1257	1.1294	1.1332	- .3440	- .3446	- .3452
27	1.1374	1.1414	1.1453	- .3613	- .3619	- .3626
28	1.1500	1.1542	1.1583	- .3792	- .3799	- .3806
29	1.1634	1.1678	1.1722	- .3977	- .3985	- .3992

$\phi_c = 55°$ (continued)

Table 2

$\phi°-180°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
45	1.0708	1.0765	1.0822	.6004	.6045	.6086
46	1.1399	1.1463	1.1527	.6707	.6756	.6804
47	1.2195	1.2267	1.2340	.7546	.7604	.7662
48	1.3131	1.3215	1.3299	.8569	.8638	.8709
49	1.4263	1.4361	1.4459	.9848	.9934	1.0021
50	1.5681	1.5798	1.5916	1.1511	1.1619	1.1728
51	1.7553	1.7697	1.7842	1.3783	1.3924	1.4067
52	2.0224	2.0410	2.0599	1.7145	1.7340	1.7537
53	2.4588	2.4853	2.5120	2.2844	2.3140	2.3440
54	3.4196	3.4660	3.5132	3.5867	3.6435	3.7012

$\phi_c = 60°$

$\phi°-180°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
0	.0000	.0000	.0000	.0000	.0000	.0000
1	.0116	.0116	.0116	.0001	.0001	.0001
2	.0233	.0233	.0233	.0004	.0004	.0004
3	.0350	.0350	.0350	.0009	.0009	.0009
4	.0466	.0467	.0467	.0016	.0016	.0016
5	.0584	.0584	.0584	.0026	.0026	.0026
6	.0701	.0702	.0702	.0037	.0037	.0037
7	.0820	.0820	.0820	.0050	.0050	.0050
8	.0938	.0939	.0939	.0066	.0066	.0066
9	.1058	.1059	.1059	.0084	.0084	.0084
10	.1178	.1179	.1180	.0104	.0104	.0104
11	.1300	.1300	.1301	.0126	.0127	.0127
12	.1422	.1423	.1424	.0151	.0152	.0152
13	.1545	.1546	.1548	.0179	.0179	.0179
14	.1670	.1671	.1672	.0209	.0209	.0209
15	.1796	.1797	.1799	.0241	.0242	.0242
16	.1923	.1925	.1927	.0277	.0277	.0277
17	.2052	.2054	.2056	.0315	.0315	.0316
18	.2183	.2185	.2187	.0356	.0356	.0357
19	.2315	.2318	.2321	.0400	.0401	.0402
20	.2450	.2453	.2456	.0448	.0449	.0450
21	.2587	.2590	.2594	.0499	.0500	.0501
22	.2726	.2730	.2734	.0554	.0555	.0556
23	.2868	.2872	.2876	.0613	.0614	.0615
24	.3013	.3017	.3022	.0676	.0677	.0678
25	.3160	.3165	.3170	.0743	.0745	.0746
26	.3311	.3317	.3322	.0815	.0817	.0819
27	.3466	.3472	.3478	.0892	.0894	.0896
28	.3624	.3631	.3638	.0975	.0977	.0979
29	.3787	.3794	.3801	.1063	.1066	.1068

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$\phi_c = 60°$ (continued)

$\phi°-180°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
30	1.1778	1.1825	1.1871	- .4169	- .4177	- .4186
31	1.1932	1.1981	1.2031	- .4369	- .4378	- .4388
32	1.2098	1.2150	1.2202	- .4577	- .4588	- .4598
33	1.2276	1.2331	1.2386	- .4795	- .4806	- .4818
34	1.2467	1.2525	1.2583	- .5023	- .5036	- .5048
35	1.2673	1.2734	1.2796	- .5263	- .5276	- .5290
36	1.2895	1.2960	1.3026	- .5516	- .5530	- .5545
37	1.3136	1.3205	1.3274	- .5782	- .5798	- .5814
38	1.3397	1.3470	1.3544	- .6065	- .6082	- .6100
39	1.3681	1.3758	1.3837	- .6365	- .6384	- .6404
40	1.3990	1.4073	1.4156	- .6686	- .6707	- .6728
41	1.4328	1.4417	1.4505	- .7030	- .7053	- .7076
42	1.4700	1.4794	1.4889	- .7400	- .7426	- .7451
43	1.5110	1.5211	1.5313	- .7801	- .7829	- .7857
44	1.5564	1.5673	1.5782	- .8237	- .8268	- .8299
45	1.6071	1.6188	1.6306	- .8714	- .8748	- .8783
46	1.6639	1.6766	1.6893	- .9240	- .9278	- .9317
47	1.7282	1.7419	1.7557	- .9825	- .9868	- .9911
48	1.8013	1.8163	1.8315	-1.0481	-1.0529	-1.0577
49	1.8856	1.9021	1.9187	-1.1224	-1.1279	-1.1333
50	1.9838	2.0020	2.0204	-1.2077	-1.2139	-1.2202
51	2.0999	2.1202	2.1407	-1.3071	-1.3143	-1.3215
52	2.2395	2.2624	2.2855	-1.4251	-1.4334	-1.4418
53	2.4114	2.4375	2.4640	-1.5682	-1.5781	-1.5880
54	2.6291	2.6595	2.6902	-1.7472	-1.7591	-1.7710
55	2.9157	2.9519	2.9885	-1.9800	-1.9946	-2.0094
56	3.3145	3.3590	3.4042	-2.2996	-2.3186	-2.3376
57	3.9177	3.9757	4.0345	-2.7781	-2.8037	-2.8295
58	4.9727	5.0557	5.1401	-3.6050	-3.6436	-3.6827
59	7.5110	7.6609	7.8137	-5.5724	-5.6473	-5.7233

$\phi_c = 65°$

$\phi°-180°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
0	1.0000	1.0000	1.0000	.0000	.0000	.0000
1	1.0002	1.0003	1.0004	- .0090	- .0090	- .0090
2	1.0008	1.0010	1.0011	- .0180	- .0180	- .0180
3	1.0016	1.0019	1.0022	- .0270	- .0270	- .0270
4	1.0028	1.0032	1.0035	- .0360	- .0360	- .0360
5	1.0043	1.0047	1.0052	- .0451	- .0451	- .0451
6	1.0061	1.0066	1.0072	- .0542	- .0542	- .0542
7	1.0082	1.0088	1.0095	- .0634	- .0634	- .0634
8	1.0106	1.0113	1.0121	- .0726	- .0726	- .0726
9	1.0134	1.0142	1.0150	- .0819	- .0819	- .0819
10	1.0165	1.0174	1.0183	- .0913	- .0913	- .0913
11	1.0199	1.0209	1.0220	- .1007	- .1008	- .1008
12	1.0237	1.0248	1.0260	- .1103	- .1103	- .1104
13	1.0279	1.0291	1.0303	- .1200	- .1200	- .1201
14	1.0324	1.0338	1.0351	- .1297	- .1298	- .1299

$\phi°-180°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
30	.3954	.3962	.3970	.1158	.1161	.1164
31	.4127	.4135	.4144	.1259	.1263	.1266
32	.4304	.4314	.4323	.1368	.1372	.1376
33	.4488	.4498	.4508	.1485	.1490	.1494
34	.4678	.4689	.4700	.1611	.1616	.1621
35	.4876	.4888	.4900	.1747	.1753	.1758
36	.5081	.5094	.5107	.1894	.1900	.1906
37	.5296	.5310	.5324	.2052	.2059	.2067
38	.5520	.5535	.5550	.2224	.2232	.2240
39	.5755	.5772	.5788	.2411	.2421	.2430
40	.6003	.6021	.6039	.2615	.2626	.2636
41	.6264	.6284	.6303	.2839	.2850	.2862
42	.6541	.6563	.6584	.3084	.3097	.3111
43	.6837	.6860	.6883	.3355	.3370	.3385
44	.7153	.7178	.7204	.3655	.3672	.3689
45	.7493	.7521	.7549	.3989	.4009	.4028
46	.7862	.7892	.7923	.4365	.4387	.4409
47	.8264	.8298	.8332	.4789	.4814	.4840
48	.8707	.8745	.8782	.5273	.5302	.5332
49	.9200	.9241	.9283	.5829	.5864	.5898
50	.9754	.9800	.9847	.6478	.6518	.6559
51	1.0386	1.0438	1.0491	.7245	.7293	.7340
52	1.1120	1.1180	1.1240	.8169	.8225	.8282
53	1.1991	1.2060	1.2129	.9305	.9373	.9442
54	1.3055	1.3136	1.3217	1.0744	1.0829	1.0914
55	1.4406	1.4503	1.4601	1.2639	1.2747	1.2855
56	1.6216	1.6337	1.6458	1.5276	1.5418	1.5561
57	1.8853	1.9011	1.9170	1.9266	1.9464	1.9664
58	2.3290	2.3518	2.3748	2.6244	2.6552	2.6864
59	3.3543	3.3960	3.4382	4.3035	4.3653	4.4280

$\phi_c = 65°$

$\phi°-180°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
0	.0000	.0000	.0000	.0000	.0000	.0000
1	.0090	.0090	.0090	.0001	.0001	.0001
2	.0180	.0180	.0180	.0003	.0003	.0003
3	.0270	.0270	.0270	.0007	.0007	.0007
4	.0360	.0360	.0360	.0013	.0013	.0013
5	.0450	.0450	.0450	.0020	.0020	.0020
6	.0541	.0541	.0541	.0028	.0028	.0028
7	.0632	.0632	.0632	.0039	.0039	.0039
8	.0723	.0724	.0724	.0051	.0051	.0051
9	.0815	.0816	.0816	.0065	.0065	.0065
10	.0908	.0908	.0909	.0080	.0080	.0080
11	.1001	.1001	.1002	.0097	.0097	.0097
12	.1095	.1095	.1096	.0116	.0116	.0117
13	.1189	.1190	.1190	.0137	.0137	.0138
14	.1284	.1285	.1286	.0160	.0160	.0160

$\phi°-180°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
15	1.0374	1.0388	1.0402	- .1397	- .1398	- .1399
16	1.0427	1.0442	1.0458	- .1498	- .1499	- .1500
17	1.0484	1.0501	1.0518	- .1600	- .1601	- .1602
18	1.0546	1.0564	1.0582	- .1704	- .1705	- .1707
19	1.0613	1.0632	1.0650	- .1810	- .1812	- .1813
20	1.0684	1.0704	1.0724	- .1918	- .1920	- .1922
21	1.0760	1.0781	1.0803	- .2028	- .2030	- .2032
22	1.0841	1.0864	1.0887	- .2141	- .2143	- .2145
23	1.0928	1.0952	1.0976	- .2256	- .2259	- .2261
24	1.1021	1.1046	1.1072	- .2374	- .2377	- .2380
25	1.1120	1.1146	1.1173	- .2495	- .2498	- .2501
26	1.1225	1.1253	1.1282	- .2619	- .2623	- .2626
27	1.1337	1.1367	1.1397	- .2747	- .2751	- .2755
28	1.1457	1.1488	1.1520	- .2879	- .2883	- .2887
29	1.1584	1.1617	1.1650	- .3015	- .3019	- .3023
30	1.1720	1.1755	1.1790	- .3155	- .3160	- .3165
31	1.1864	1.1901	1.1938	- .3300	- .3306	- .3311
32	1.2019	1.2058	1.2097	- .3451	- .3457	- .3462
33	1.2184	1.2225	1.2266	- .3607	- .3613	- .3620
34	1.2360	1.2403	1.2447	- .3770	- .3777	- .3784
35	1.2548	1.2594	1.2640	- .3940	- .3947	- .3955
36	1.2750	1.2798	1.2847	- .4117	- .4125	- .4133
37	1.2967	1.3018	1.3069	- .4303	- .4312	- .4320
38	1.3199	1.3253	1.3307	- .4498	- .4507	- .4517
39	1.3450	1.3507	1.3564	- .4703	- .4713	- .4724
40	1.3720	1.3780	1.3840	- .4919	- .4931	- .4942
41	1.4011	1.4075	1.4139	- .5148	- .5161	- .5173
42	1.4327	1.4395	1.4463	- .5392	- .5405	- .5419
43	1.4670	1.4742	1.4814	- .5651	- .5666	- .5680
44	1.5043	1.5120	1.5197	- .5928	- .5944	- .5960
45	1.5451	1.5533	1.5615	- .6225	- .6243	- .6261
46	1.5899	1.5986	1.6074	- .6546	- .6565	- .6585
47	1.6392	1.6486	1.6580	- .6893	- .6915	- .6936
48	1.6938	1.7038	1.7139	- .7271	- .7295	- .7318
49	1.7545	1.7653	1.7762	- .7685	- .7711	- .7737
50	1.8224	1.8341	1.8459	- .8141	- .8171	- .8200
51	1.8989	1.9116	1.9245	- .8648	- .8681	- .8713
52	1.9858	1.9997	2.0137	- .9216	- .9252	- .9288
53	2.0854	2.1007	2.1161	- .9858	- .9899	- .9939
54	2.2008	2.2177	2.2347	-1.0591	-1.0638	-1.0684
55	2.3362	2.3550	2.3740	-1.1442	-1.1495	-1.1548
56	2.4976	2.5187	2.5400	-1.2442	-1.2504	-1.2565
57	2.6935	2.7175	2.7418	-1.3644	-1.3716	-1.3788
58	2.9371	2.9649	2.9929	-1.5120	-1.5206	-1.5292
59	3.2494	3.2821	3.3152	-1.6993	-1.7097	-1.7202
60	3.6668	3.7064	3.7464	-1.9470	-1.9600	-1.9730
61	4.2580	4.3077	4.3581	-2.2944	-2.3112	-2.3282
62	5.1734	5.2398	5.3070	-2.8270	-2.8504	-2.8740
63	6.8267	6.9254	7.0255	-3.7800	-3.8165	-3.8533
64	11.0212	11.2111	11.4043	-6.1757	-6.2504	-6.3261

Table 2

$\phi°-180°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 9.03$
15	.1380	.1381	.1382	.0185	.0185	.0185
16	.1478	.1479	.1480	.0212	.0212	.0212
17	.1576	.1577	.1578	.0241	.0241	.0242
18	.1675	.1676	.1678	.0272	.0273	.0273
19	.1775	.1777	.1779	.0306	.0306	.0307
20	.1877	.1879	.1881	.0342	.0342	.0343
21	.1980	.1982	.1984	.0381	.0381	.0382
22	.2085	.2087	.2090	.0422	.0422	.0423
23	.2192	.2194	.2196	.0466	.0467	.0467
24	.2300	.2302	.2305	.0513	.0514	.0515
25	.2410	.2413	.2416	.0563	.0564	.0565
26	.2522	.2525	.2529	.0617	.0618	.0619
27	.2637	.2640	.2644	.0674	.0675	.0676
28	.2753	.2757	.2761	.0735	.0736	.0737
29	.2873	.2877	.2881	.0799	.0801	.0803
30	.2995	.2999	.3004	.0869	.0870	.0872
31	.3120	.3125	.3130	.0942	.0944	.0946
32	.3248	.3253	.3259	.1021	.1023	.1025
33	.3380	.3386	.3392	.1105	.1107	.1110
34	.3516	.3522	.3528	.1195	.1198	.1200
35	.3656	.3662	.3669	.1291	.1294	.1297
36	.3800	.3807	.3815	.1394	.1397	.1401
37	.3949	.3957	.3965	.1504	.1508	.1512
38	.4104	.4112	.4121	.1623	.1627	.1632
39	.4265	.4274	.4283	.1751	.1756	.1761
40	.4432	.4441	.4451	.1889	.1894	.1900
41	.4606	.4616	.4627	.2037	.2043	.2050
42	.4788	.4799	.4811	.2199	.2205	.2213
43	.4979	.4991	.5004	.2374	.2381	.2389
44	.5180	.5193	.5207	.2564	.2573	.2582
45	.5392	.5407	.5421	.2773	.2783	.2793
46	.5617	.5632	.5648	.3001	.3013	.3024
47	.5856	.5873	.5890	.3253	.3266	.3278
48	.6111	.6130	.6148	.3532	.3546	.3560
49	.6385	.6405	.6426	.3842	.3858	.3874
50	.6682	.6704	.6726	.4189	.4207	.4226
51	.7004	.7028	.7052	.4580	.4601	.4622
52	.7357	.7384	.7411	.5025	.5048	.5072
53	.7748	.7777	.7807	.5534	.5561	.5589
54	.8184	.8217	.8250	.6124	.6156	.6188
55	.8678	.8714	.8751	.6816	.6853	.6891
56	.9244	.9287	.9327	.7641	.7685	.7730
57	.9907	.9954	1.0001	.8643	.8696	.8749
58	1.0700	1.0754	1.0809	.9889	.9953	1.0018
59	1.1678	1.1742	1.1806	1.1486	1.1566	1.1647
60	1.2934	1.3011	1.3089	1.3621	1.3723	1.3826
61	1.4643	1.4739	1.4836	1.6645	1.6781	1.6918
62	1.7181	1.7309	1.7437	2.1327	2.1521	2.1717
63	2.1573	2.1761	2.1950	2.9785	3.0094	3.0407
64	3.2227	3.2585	3.2947	5.1242	5.1894	5.2555

$\phi°-180°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
0	1.0000	1.0000	1.0000	.0000	.0000	.0000
1	1.0002	1.0003	1.0004	-.0068	-.0068	-.0068
2	1.0007	1.0009	1.0010	-.0135	-.0135	-.0135
3	1.0016	1.0018	1.0020	-.0203	-.0203	-.0203
4	1.0027	1.0030	1.0033	-.0271	-.0271	-.0271
5	1.0042	1.0045	1.0048	-.0339	-.0339	-.0339
6	1.0059	1.0063	1.0067	-.0408	-.0408	-.0408
7	1.0080	1.0085	1.0090	-.0477	-.0477	-.0477
8	1.0104	1.0110	1.0115	-.0546	-.0546	-.0546
9	1.0131	1.0138	1.0144	-.0616	-.0616	-.0616
10	1.0162	1.0169	1.0176	-.0686	-.0686	-.0686
11	1.0196	1.0204	1.0212	-.0757	-.0757	-.0757
12	1.0234	1.0242	1.0251	-.0828	-.0829	-.0829
13	1.0275	1.0284	1.0293	-.0901	-.0901	-.0902
14	1.0320	1.0330	1.0340	-.0974	-.0974	-.0975
15	1.0368	1.0379	1.0390	-.1048	-.1049	-.1049
16	1.0421	1.0432	1.0444	-.1123	-.1124	-.1124
17	1.0478	1.0490	1.0502	-.1199	-.1200	-.1201
18	1.0538	1.0552	1.0565	-.1277	-.1277	-.1278
19	1.0604	1.0618	1.0632	-.1355	-.1356	-.1357
20	1.0673	1.0688	1.0703	-.1435	-.1436	-.1437
21	1.0748	1.0764	1.0780	-.1517	-.1518	-.1519
22	1.0827	1.0844	1.0861	-.1600	-.1601	-.1602
23	1.0912	1.0929	1.0947	-.1684	-.1686	-.1687
24	1.1002	1.1021	1.1039	-.1771	-.1772	-.1774
25	1.1097	1.1117	1.1137	-.1860	-.1861	-.1863
26	1.1199	1.1220	1.1241	-.1950	-.1952	-.1954
27	1.1307	1.1329	1.1352	-.2043	-.2045	-.2047
28	1.1422	1.1445	1.1469	-.2139	-.2141	-.2143
29	1.1544	1.1569	1.1593	-.2237	-.2239	-.2242
30	1.1673	1.1699	1.1725	-.2338	-.2341	-.2343
31	1.1811	1.1838	1.1866	-.2442	-.2445	-.2448
32	1.1957	1.1986	1.2015	-.2550	-.2553	-.2556
33	1.2113	1.2143	1.2173	-.2661	-.2664	-.2668
34	1.2278	1.2310	1.2341	-.2776	-.2780	-.2784
35	1.2454	1.2487	1.2521	-.2896	-.2900	-.2904
36	1.2641	1.2676	1.2711	-.3020	-.3024	-.3028
37	1.2841	1.2878	1.2915	-.3149	-.3154	-.3158
38	1.3054	1.3093	1.3132	-.3284	-.3289	-.3294
39	1.3281	1.3323	1.3364	-.3424	-.3430	-.3435
40	1.3525	1.3568	1.3612	-.3572	-.3578	-.3584
41	1.3786	1.3832	1.3877	-.3726	-.3733	-.3739
42	1.4066	1.4114	1.4163	-.3889	-.3896	-.3903
43	1.4366	1.4418	1.4469	-.4060	-.4068	-.4076
44	1.4690	1.4744	1.4799	-.4242	-.4250	-.4258
45	1.5040	1.5097	1.5155	-.4434	-.4443	-.4452
46	1.5418	1.5479	1.5540	-.4638	-.4648	-.4658
47	1.5829	1.5894	1.5958	-.4856	-.4867	-.4878
48	1.6275	1.6344	1.6413	-.5089	-.5101	-.5113
49	1.6763	1.6836	1.6910	-.5340	-.5353	-.5366

$\phi°-180°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
0	.0000	.0000	.0000	.0000	.0000.	.0000
1	.0068	.0068	.0068	.0001	.0001	.0001
2	.0135	.0135	.0135	.0002	.0002	.0002
3	.0203	.0203	.0203	.0005	.0005	.0005
4	.0271	.0271	.0271	.0009	.0009	.0009
5	.0339	.0339	.0339	.0015	.0015	.0015
6	.0407	.0407	.0407	.0021	.0021	.0021
7	.0475	.0475	.0476	.0029	.0029	.0029
8	.0544	.0544	.0544	.0038	.0038	.0038
9	.0613	.0613	.0613	.0049	.0049	.0049
10	.0682	.0683	.0683	.0060	.0060	.0060
11	.0752	.0752	.0753	.0073	.0073	.0073
12	.0822	.0823	.0823	.0087	.0087	.0087
13	.0893	.0893	.0894	.0103	.0103	.0103
14	.0964	.0965	.0965	.0120	.0120	.0120
15	.1036	.1036	.1037	.0139	.0139	.0139
16	.1108	.1109	.1109	.0159	.0159	.0159
17	.1181	.1182	.1183	.0180	.0180	.0181
18	.1255	.1256	.1257	.0204	.0204	.0204
19	.1329	.1330	.1331	.0229	.0229	.0229
20	.1405	.1406	.1407	.0255	.0255	.0256
21	.1481	.1482	.1483	.0284	.0284	.0284
22	.1558	.1560	.1561	.0314	.0314	.0315
23	.1637	.1638	.1639	.0347	.0347	.0347
24	.1716	.1717	.1719	.0381	.0381	.0382
25	.1797	.1798	.1800	.0418	.0418	.0419
26	.1878	.1880	.1882	.0457	.0457	.0458
27	.1962	.1964	.1966	.0498	.0499	.0500
28	.2046	.2049	.2051	.0543	.0543	.0544
29	.2133	.2135	.2137	.0589	.0590	.0591
30	.2221	.2223	.2226	.0639	.0640	.0641
31	.2310	.2313	.2316	.0692	.0693	.0694
32	.2402	.2405	.2408	.0748	.0749	.0751
33	.2496	.2499	.2502	.0808	.0809	.0811
34	.2592	.2595	.2599	.0872	.0873	.0875
35	.2690	.2694	.2698	.0939	.0941	.0943
36	.2791	.2795	.2799	.1011	.1013	.1015
37	.2895	.2899	.2904	.1088	.1090	.1092
38	.3002	.3007	.3011	.1170	.1172	.1175
39	.3112	.3117	.3122	.1258	.1260	.1263
40	.3226	.3231	.3236	.1351	.1354	.1357
41	.3344	.3349	.3355	.1452	.1455	.1458
42	.3465	.3471	.3477	.1560	.1563	.1567
43	.3592	.3598	.3605	.1676	.1680	.1683
44	.3723	.3730	.3737	.1800	.1805	.1809
45	.3860	.3868	.3875	.1935	.1940	.1945
46	.4003	.4011	.4019	.2081	.2086	.2092
47	.4153	.4162	.4171	.2239	.2245	.2251
48	.4311	.4320	.4330	.2411	.2418	.2425
49	.4477	.4487	.4497	.2599	.2606	.2614

103

$\phi°-180°$	τ			σ		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
50	1.7297	1.7375	1.7454	- .5611	- .5625	- .5639
51	1.7884	1.7968	1.8053	- .5904	- .5919	- .5935
52	1.8533	1.8624	1.8715	- .6224	- .6241	- .6257
53	1.9253	1.9351	1.9449	- .6574	- .6592	- .6611
54	2.0058	2.0164	2.0270	- .6959	- .6980	- .7001
55	2.0962	2.1077	2.1192	- .7387	- .7410	- .7433
56	2.1985	2.2111	2.2237	- .7866	- .7892	- .7917
57	2.3153	2.3291	2.3429	- .8406	- .8435	- .8463
58	2.4500	2.4652	2.4805	- .9021	- .9054	- .9086
59	2.6069	2.6238	2.6408	- .9731	- .9768	- .9805
60	2.7924	2.8114	2.8305	-1.0561	-1.0603	-1.0646
61	3.0151	3.0366	3.0583	-1.1548	-1.1597	-1.1647
62	3.2880	3.3128	3.3377	-1.2745	-1.2803	-1.2861
63	3.6309	3.6598	3.6889	-1.4235	-1.4305	-1.4375
64	4.0759	4.1103	4.1451	-1.6152	-1.6238	-1.6324
65	4.6790	4.7214	4.7641	-1.8729	-1.8838	-1.8946
66	5.5486	5.6029	5.6577	-2.2414	-2.2557	-2.2701
67	6.9259	7.0002	7.0753	-2.8205	-2.8408	-2.8611
68	9.4929	9.6073	9.7231	-3.8917	-3.9242	-3.9570
69	16.3497	16.5842	16.8220	-6.7325	-6.8027	-6.8738

$\phi_c = 75°$

$\phi°-180°$	τ			σ		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
0	1.0000	1.0000	1.0000	.0000	.0000	.0000
1	1.0002	1.0002	1.0003	- .0048	- .0048	- .0048
2	1.0007	1.0008	1.0009	- .0097	- .0097	- .0097
3	1.0015	1.0017	1.0018	- .0145	- .0145	- .0145
4	1.0026	1.0028	1.0030	- .0194	- .0194	- .0194
5	1.0041	1.0043	1.0046	- .0243	- .0243	- .0243
6	1.0058	1.0061	1.0064	- .0292	- .0292	- .0292
7	1.0079	1.0082	1.0086	- .0341	- .0341	- .0341
8	1.0102	1.0106	1.0110	- .0391	- .0391	- .0391
9	1.0130	1.0134	1.0138	- .0440	- .0441	- .0441
10	1.0160	1.0165	1.0170	- .0491	- .0491	- .0491
11	1.0194	1.0199	1.0205	- .0541	- .0541	- .0542
12	1.0231	1.0237	1.0243	- .0592	- .0592	- .0593
13	1.0272	1.0278	1.0285	- .0644	- .0644	- .0644
14	1.0316	1.0323	1.0330	- .0696	- .0696	- .0696
15	1.0364	1.0372	1.0379	- .0749	- .0749	- .0749
16	1.0416	1.0424	1.0432	- .0802	- .0802	- .0802
17	1.0472	1.0480	1.0489	- .0856	- .0856	- .0857
18	1.0532	1.0541	1.0550	- .0911	- .0911	- .0911
19	1.0596	1.0606	1.0616	- .0966	- .0967	- .0967
20	1.0664	1.0675	1.0686	- .1023	- .1023	- .1024
21	1.0737	1.0749	1.0760	- .1080	- .1081	- .1081
22	1.0815	1.0827	1.0839	- .1138	- .1139	- .1140
23	1.0898	1.0910	1.0923	- .1198	- .1199	- .1199
24	1.0985	1.0999	1.1012	- .1259	- .1259	- .1260

$\phi_c = 70°$ (continued)

Table 2

$\phi°-180°$	ξ			η		
	$f=0.01$	$f=0.02$	$f=0.03$	$f=0.01$	$f=0.02$	$f=0.03$
50	.4653	.4664	.4674	.2805	.2813	.2822
51	.4839	.4851	.4863	.3031	.3041	.3050
52	.5038	.5051	.5064	.3281	.3292	.3303
53	.5251	.5265	.5279	.3559	.3571	.3583
54	.5481	.5496	.5510	.3869	.3883	.3896
55	.5729	.5745	.5762	.4217	.4233	.4249
56	.6000	.6018	.6036	.4612	.4630	.4648
57	.6298	.6318	.6337	.5062	.5083	.5103
58	.6629	.6650	.6672	.5581	.5605	.5629
59	.6999	.7023	.7047	.6186	.6214	.6241
60	.7420	.7447	.7474	.6902	.6934	.6966
61	.7906	.7936	.7966	.7760	.7799	.7837
62	.8477	.8511	.8546	.8813	.8859	.8905
63	.9165	.9204	.9244	1.0135	1.0191	1.0248
64	1.0020	1.0066	1.0113	1.1851	1.1921	1.1992
65	1.1128	1.1184	1.1241	1.4177	1.4268	1.4359
66	1.2654	1.2725	1.2796	1.7531	1.7654	1.7777
67	1.4959	1.5053	1.5149	2.2844	2.3020	2.3199
68	1.9048	1.9189	1.9332	3.2745	3.3035	3.3327
69	2.9413	2.9692	2.9974	5.9193	5.9835	6.0484

$\phi_c = 75°$

$\phi°-180°$	ξ			η		
	$f=0.01$	$f=0.02$	$f=0.03$	$f=0.01$	$f=0.02$	$f=0.03$
0	.0000	.0000	.0000	.0000	.0000	.0000
1	.0048	.0048	.0048	.0000	.0000	.0000
2	.0097	.0097	.0097	.0002	.0002	.0002
3	.0145	.0145	.0145	.0004	.0004	.0004
4	.0194	.0194	.0194	.0007	.0007	.0007
5	.0243	.0243	.0243	.0011	.0011	.0011
6	.0291	.0291	.0291	.0015	.0015	.0015
7	.0340	.0340	.0340	.0021	.0021	.0021
8	.0389	.0389	.0390	.0027	.0027	.0027
9	.0439	.0439	.0439	.0035	.0035	.0035
10	.0488	.0488	.0488	.0043	.0043	.0043
11	.0538	.0538	.0538	.0052	.0052	.0052
12	.0588	.0588	.0588	.0062	.0062	.0062
13	.0638	.0638	.0639	.0074	.0074	.0074
14	.0689	.0689	.0689	.0086	.0086	.0086
15	.0740	.0740	.0740	.0099	.0099	.0099
16	.0791	.0792	.0792	.0113	.0113	.0113
17	.0843	.0843	.0844	.0128	.0128	.0129
18	.0895	.0896	.0896	.0145	.0145	.0145
19	.0948	.0948	.0949	.0163	.0163	.0163
20	.1001	.1002	.1002	.0181	.0181	.0182
21	.1055	.1055	.1056	.0201	.0202	.0202
22	.1109	.1110	.1110	.0223	.0223	.0223
23	.1164	.1165	.1165	.0246	.0246	.0246
24	.1220	.1221	.1221	.0270	.0270	.0270

$\phi°-180°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
25	1.1079	1.1093	1.1107	- .1321	- .1321	- .1322
26	1.1178	1.1192	1.1207	- .1384	- .1385	- .1386
27	1.1282	1.1298	1.1314	- .1449	- .1450	- .1451
28	1.1393	1.1410	1.1426	- .1515	- .1516	- .1517
29	1.1511	1.1528	1.1546	- .1583	- .1584	- .1585
30	1.1636	1.1654	1.1672	- .1653	- .1654	- .1655
31	1.1767	1.1787	1.1806	- .1724	- .1726	- .1727
32	1.1907	1.1927	1.1948	- .1798	- .1800	- .1801
33	1.2055	1.2076	1.2098	- .1874	- .1876	- .1877
34	1.2212	1.2234	1.2256	- .1953	- .1954	- .1956
35	1.2378	1.2401	1.2425	- .2033	- .2035	- .2037
36	1.2554	1.2579	1.2603	- .2117	- .2119	- .2122
37	1.2741	1.2767	1.2793	- .2204	- .2206	- .2209
38	1.2940	1.2967	1.2994	- .2294	- .2297	- .2299
39	1.3151	1.3179	1.3208	- .2388	- .2390	- .2393
40	1.3375	1.3405	1.3435	- .2485	- .2488	- .2491
41	1.3614	1.3645	1.3677	- .2587	- .2590	- .2593
42	1.3868	1.3901	1.3934	- .2693	- .2696	- .2699
43	1.4140	1.4175	1.4210	- .2804	- .2807	- .2811
44	1.4430	1.4467	1.4504	- .2920	- .2924	- .2928
45	1.4740	1.4779	1.4818	- .3042	- .3047	- .3051
46	1.5073	1.5114	1.5155	- .3171	- .3176	- .3181
47	1.5430	1.5474	1.5517	- .3308	- .3313	- .3318
48	1.5815	1.5861	1.5907	- .3452	- .3457	- .3462
49	1.6230	1.6278	1.6327	- .3605	- .3611	- .3616
50	1.6678	1.6730	1.6781	- .3768	- .3774	- .3780
51	1.7164	1.7219	1.7274	- .3942	- .3949	- .3955
52	1.7691	1.7750	1.7809	- .4128	- .4136	- .4143
53	1.8267	1.8329	1.8392	- .4328	- .4337	- .4345
54	1.8896	1.8963	1.9030	- .4545	- .4554	- .4563
55	1.9588	1.9660	1.9732	- .4780	- .4790	- .4799
56	2.0350	2.0428	2.0505	- .5036	- .5046	- .5057
57	2.1195	2.1279	2.1362	- .5316	- .5328	- .5339
58	2.2137	2.2227	2.2317	- .5624	- .5637	- .5650
59	2.3191	2.3289	2.3388	- .5966	- .5981	- .5995
60	2.4382	2.4488	2.4596	- .6348	- .6364	- .6380
61	2.5735	2.5852	2.5970	- .6778	- .6796	- .6814
62	2.7286	2.7416	2.7546	- .7266	- .7287	- .7307
63	2.9084	2.9228	2.9373	- .7827	- .7850	- .7873
64	3.1193	3.1354	3.1515	- .8478	- .8505	- .8531
65	3.3701	3.3882	3.4065	- .9246	- .9277	- .9307
66	3.6734	3.6942	3.7151	-1.0168	-1.0204	-1.0239
67	4.0482	4.0723	4.0966	-1.1298	-1.1341	-1.1383
68	4.5235	4.5520	4.5806	-1.2721	-1.2772	-1.2823
69	5.1472	5.1816	5.2161	-1.4575	-1.4638	-1.4701
70	6.0037	6.0466	6.0897	-1.7104	-1.7184	-1.7264
71	7.2585	7.3143	7.3706	-2.0784	-2.0892	-2.1000
72	9.2869	9.3651	9.4439	-2.6699	-2.6855	-2.7011
73	13.1761	13.3005	13.4260	-3.7975	-3.8231	-3.8489
74	24.0597	24.3291	24.6014	-6.9356	-6.9939	-7.0526

$\phi°-180°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
25	.1276	.1277	.1278	.0296	.0296	.0296
26	.1333	.1334	.1335	.0323	.0323	.0323
27	.1391	.1392	.1393	.0352	.0352	.0352
28	.1450	.1451	.1452	.0382	.0383	.0383
29	.1510	.1512	.1512	.0415	.0415	.0416
30	.1571	.1572	.1573	.0449	.0450	.0450
31	.1632	.1634	.1635	.0486	.0486	.0487
32	.1695	.1697	.1698	.0524	.0525	.0525
33	.1759	.1761	.1762	.0565	.0565	.0566
34	.1825	.1826	.1828	.0608	.0609	.0610
35	.1891	.1893	.1895	.0654	.0655	.0656
36	.1960	.1961	.1963	.0703	.0703	.0705
37	.2029	.2031	.2033	.0754	.0755	.0756
38	.2101	.2103	.2105	.0809	.0810	.0811
39	.2174	.2176	.2179	.0867	.0869	.0870
40	.2249	.2252	.2254	.0929	.0931	.0932
41	.2326	.2329	.2332	.0995	.0997	.0998
42	.2406	.2409	.2411	.1066	.1067	.1069
43	.2488	.2491	.2494	.1141	.1142	.1144
44	.2572	.2575	.2579	.1221	.1223	.1225
45	.2659	.2663	.2666	.1307	.1309	.1311
46	.2750	.2753	.2757	.1399	.1401	.1404
47	.2843	.2847	.2851	.1497	.1500	.1503
48	.2941	.2945	.2949	.1604	.1607	.1610
49	.3042	.3047	.3051	.1718	.1721	.1725
50	.3148	.3153	.3158	.1842	.1846	.1850
51	.3259	.3264	.3269	.1976	.1980	.1985
52	.3375	.3380	.3386	.2122	.2127	.2132
53	.3497	.3503	.3509	.2281	.2286	.2292
54	.3625	.3632	.3638	.2455	.2461	.2467
55	.3762	.3769	.3776	.2646	.2653	.2660
56	.3907	.3914	.3922	.2857	.2865	.2872
57	.4061	.4069	.4077	.3091	.3099	.3107
58	.4227	.4236	.4244	.3351	.3360	.3370
59	.4406	.4415	.4425	.3643	.3653	.3664
60	.4599	.4610	.4620	.3972	.3984	.3996
61	.4811	.4822	.4833	.4346	.4360	.4373
62	.5044	.5056	.5069	.4775	.4791	.4806
63	.5303	.5316	.5330	.5272	.5290	.5308
64	.5593	.5608	.5623	.5856	.5876	.5897
65	.5924	.5941	.5957	.6549	.6573	.6598
66	.6306	.6325	.6344	.7388	.7417	.7447
67	.6756	.6778	.6799	.8424	.8460	.8495
68	.7300	.7325	.7350	.9739	.9782	.9826
69	.7979	.8008	8037	1.1464	1.1518	1.1573
70	.8863	.8898	.8934	1.3833	1.3904	1.3975
71	1.0090	1.0134	1.0179	1.7303	1.7400	1.7497
72	1.1962	1.2022	1.2082	2.2914	2.3056	2.3199
73	1.5341	1.5431	1.5521	3.3671	3.3910	3.4150
74	2.4199	2.4381	2.4564	6.3776	6.4327	6.4884

$$\phi_c = 80°$$

$\phi°-180°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
0	1.0000	1.0000	1.0000	.0000	.0000	.0000
1	1.0002	1.0002	1.0002	-.0031	-.0031	-.0031
2	1.0007	1.0007	1.0008	-.0063	-.0063	-.0063
3	1.0015	1.0016	1.0017	-.0094	-.0094	-.0094
4	1.0026	1.0027	1.0028	-.0125	-.0125	-.0125
5	1.0040	1.0041	1.0043	-.0157	-.0157	-.0157
6	1.0057	1.0059	1.0061	-.0188	-.0188	-.0188
7	1.0077	1.0080	1.0082	-.0220	-.0220	-.0220
8	1.0101	1.0104	1.0106	-.0252	-.0252	-.0252
9	1.0128	1.0131	1.0134	-.0284	-.0284	-.0284
10	1.0158	1.0161	1.0164	-.0316	-.0316	-.0316
11	1.0191	1.0195	1.0198	-.0349	-.0349	-.0349
12	1.0228	1.0232	1.0236	-.0382	-.0382	-.0382
13	1.0269	1.0273	1.0277	-.0415	-.0415	-.0415
14	1.0312	1.0317	1.0322	-.0448	-.0448	-.0448
15	1.0360	1.0365	1.0370	-.0482	-.0482	-.0482
16	1.0411	1.0417	1.0422	-.0516	-.0516	-.0516
17	1.0466	1.0472	1.0478	-.0551	-.0551	-.0551
18	1.0525	1.0532	1.0538	-.0586	-.0586	-.0586
19	1.0589	1.0595	1.0602	-.0621	-.0621	-.0621
20	1.0656	1.0663	1.0670	-.0657	-.0657	-.0657
21	1.0728	1.0735	1.0743	-.0693	-.0694	-.0694
22	1.0804	1.0812	1.0820	-.0731	-.0731	-.0731
23	1.0885	1.0893	1.0902	-.0768	-.0769	-.0769
24	1.0971	1.0980	1.0989	-.0807	-.0807	-.0807
25	1.1062	1.1071	1.1081	-.0846	-.0846	-.0847
26	1.1159	1.1168	1.1178	-.0886	-.0886	-.0887
27	1.1261	1.1271	1.1281	-.0927	-.0927	-.0928
28	1.1369	1.1379	1.1390	-.0968	-.0969	-.0969
29	1.1483	1.1494	1.1505	-.1011	-.1012	-.1012
30	1.1603	1.1615	1.1626	-.1055	-.1055	-.1056
31	1.1730	1.1742	1.1755	-.1099	-.1100	-.1100
32	1.1865	1.1877	1.1890	-.1145	-.1146	-.1146
33	1.2006	1.2020	1.2033	-.1192	-.1193	-.1194
34	1.2156	1.2170	1.2184	-.1241	-.1242	-.1242
35	1.2315	1.2329	1.2344	-.1291	-.1291	-.1292
36	1.2482	1.2497	1.2513	-.1342	-.1343	-.1344
37	1.2659	1.2675	1.2691	-.1395	-.1396	-.1397
38	1.2845	1.2862	1.2880	-.1450	-.1451	-.1452
39	1.3043	1.3061	1.3079	-.1506	-.1508	-.1509
40	1.3253	1.3271	1.3290	-.1565	-.1566	-.1568
41	1.3474	1.3494	1.3514	-.1626	-.1628	-.1629
42	1.3710	1.3730	1.3751	-.1690	-.1691	-.1692
43	1.3959	1.3981	1.4002	-.1756	-.1757	-.1758
44	1.4224	1.4247	1.4270	-.1824	-.1826	-.1827

$\phi°-180°$	ξ			η		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
0	.0000	.0000	.0000	.0000	.0000	.0000
1	.0031	.0031	.0031	.0000	.0000	.0000
2	.0063	.0063	.0063	.0001	.0001	.0001
3	.0094	.0094	.0094	.0002	.0002	.0002
4	.0125	.0125	.0125	.0004	.0004	.0004
5	.0157	.0157	.0157	.0007	.0007	.0007
6	.0188	.0188	.0188	.0010	.0010	.0010
7	.0220	.0220	.0220	.0013	.0013	.0013
8	.0251	.0251	.0251	.0018	.0018	.0018
9	.0283	.0283	.0283	.0022	.0022	.0022
10	.0315	.0315	.0315	.0028	.0028	.0028
11	.0347	.0347	.0347	.0034	.0034	.0034
12	.0379	.0379	.0379	.0040	.0040	.0040
13	.0411	.0411	.0411	.0047	.0047	.0047
14	.0444	.0444	.0444	.0055	.0055	.0055
15	.0476	.0476	.0477	.0064	.0064	.0064
16	.0509	.0509	.0509	.0073	.0073	.0073
17	.0542	.0542	.0543	.0082	.0083	.0083
18	.0576	.0576	.0576	.0093	.0093	.0093
19	.0609	.0609	.0610	.0104	.0104	.0104
20	.0643	.0643	.0644	.0116	.0116	.0116
21	.0677	.0678	.0678	.0129	.0129	.0129
22	.0712	.0712	.0713	.0143	.0143	.0143
23	.0747	.0747	.0747	.0157	.0157	.0157
24	.0782	.0782	.0783	.0173	.0173	.0173
25	.0818	.0818	.0818	.0189	.0189	.0189
26	.0854	.0854	.0854	.0206	.0206	.0206
27	.0890	.0891	.0891	.0224	.0224	.0224
28	.0927	.0928	.0928	.0243	.0243	.0244
29	.0965	.0965	.0966	.0264	.0264	.0264
30	.1003	.1003	.1004	.0285	.0285	.0285
31	.1041	.1042	.1042	.0308	.0308	.0308
32	.1080	.1081	.1081	.0332	.0332	.0332
33	.1120	.1121	.1121	.0357	.0357	.0358
34	.1161	.1161	.1162	.0384	.0384	.0384
35	.1202	.1202	.1203	.0412	.0412	.0413
36	.1243	.1244	.1245	.0442	.0442	.0443
37	.1286	.1287	.1288	.0473	.0474	.0474
38	.1330	.1330	.1331	.0507	.0507	.0508
39	.1374	.1375	.1376	.0542	.0543	.0543
40	.1419	.1420	.1421	.0580	.0580	.0581
41	.1466	.1467	.1468	.0619	.0620	.0620
42	.1513	.1514	.1515	.0661	.0662	.0662
43	.1562	.1563	.1564	.0706	.0706	.0707
44	.1612	.1613	.1614	.0753	.0754	.0755

$\phi°-180°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
45	1.4506	1.4530	1.4554	- .1896	- .1898	- .1899
46	1.4806	1.4831	1.4856	- .1971	- .1973	- .1975
47	1.5125	1.5152	1.5179	- .2050	- .2052	- .2054
48	1.5467	1.5495	1.5523	- .2133	- .2135	- .2137
49	1.5831	1.5861	1.5891	- .2220	- .2222	- .2224
50	1.6222	1.6253	1.6284	- .2311	- .2314	- .2316
51	1.6641	1.6674	1.6707	- .2408	- .2411	- .2414
52	1.7091	1.7126	1.7161	- .2511	- .2514	- .2517
53	1.7576	1.7613	1.7650	- .2620	- .2623	- .2626
54	1.8100	1.8139	1.8178	- .2737	- .2740	- .2743
55	1.8666	1.8708	1.8750	- .2861	- .2865	- .2868
56	1.9281	1.9326	1.9370	- .2994	- .2998	- .3002
57	1.9951	1.9998	2.0046	- .3138	- .3142	- .3146
58	2.0682	2.0733	2.0784	- .3293	- .3297	- .3302
59	2.1483	2.1538	2.1593	- .3460	- .3466	- .3470
60	2.2365	2.2424	2.2483	- .3643	- .3649	- .3654
61	2.3340	2.3404	2.3467	- .3843	- .3850	- .3856
62	2.4424	2.4492	2.4561	- .4064	- .4070	- .4077
63	2.5634	2.5708	2.5783	- .4307	- .4315	- .4322
64	2.6994	2.7075	2.7156	- .4579	- .4587	- .4595
65	2.8534	2.8623	2.8712	- .4884	- .4893	- .4902
66	3.0291	3.0388	3.0487	- .5229	- .5239	- .5249
67	3.2314	3.2422	3.2531	- .5523	- .5635	- .5646
68	3.4668	3.4789	3.4911	- .6078	- .6092	- .6104
69	3.7442	3.7578	3.7715	- .6611	- .6626	- .6641
70	4.0759	4.0914	4.1070	- .7244	- .7261	- .7278
71	4.4796	4.4974	4.5154	- .8009	- .8030	- .8050
72	4.9817	5.0025	5.0235	- .8955	- .8979	- .9003
73	5.6233	5.6482	5.6731	-1.0157	-1.0187	-1.0216
74	6.4729	6.5031	6.5336	-1.1741	-1.1777	-1.1814
75	7.6519	7.6901	7.7285	-1.3927	-1.3975	-1.4022
76	9.4016	9.4521	9.5029	-1.7157	-1.7221	-1.7285
77	12.2773	12.3493	12.4218	-2.2441	-2.2535	-2.2629
78	17.9178	18.0354	18.1538	-3.2764	-3.2922	-3.3081
79	34.3035	34.5696	34.8378	-6.2638	-6.3012	-6.3388

$\phi_c = 85°$

$\phi°-180°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
0	1.0000	1.0000	1.0000	.0000	.0000	.0000
1	1.0002	1.0002	1.0002	- .0015	- .0015	- .0015
2	1.0006	1.0007	1.0007	- .0031	- .0031	- .0031
3	1.0014	1.0015	1.0015	- .0046	- .0046	- .0046
4	1.0025	1.0026	1.0026	- .0061	- .0061	- .0061
5	1.0039	1.0040	1.0041	- .0077	- .0077	- .0077
6	1.0056	1.0057	1.0058	- .0092	- .0092	- .0092
7	1.0076	1.0077	1.0078	- .0108	- .0108	- .0108
8	1.0100	1.0101	1.0102	- .0123	- .0124	- .0124
9	1.0126	1.0128	1.0129	- .0139	- .0139	- .0139

Table 2

$\phi°-180°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
45	.1663	.1664	.1665	.0803	.0804	.0805
46	.1715	.1717	.1718	.0857	.0858	.0859
47	.1770	.1771	.1773	.0914	.0915	.0916
48	.1825	.1827	.1829	.0975	.0976	.0977
49	.1883	.1885	.1886	.1040	.1041	.1043
50	.1943	.1944	.1946	.1110	.1111	.1113
51	.2004	.2006	.2008	.1185	.1186	.1188
52	.2068	.2070	.2072	.1265	.1267	.1269
53	.2135	.2137	.2139	.1352	.1354	.1356
54	.2204	.2206	.2209	.1445	.1447	.1450
55	.2276	.2279	.2281	.1547	.1549	.1551
56	.2352	.2354	.2357	.1656	.1659	.1662
57	.2431	.2434	.2437	.1776	.1779	.1782
58	.2514	.2517	.2520	.1907	.1910	.1913
59	.2602	.2605	.2608	.2050	.2053	.2057
60	.2695	.2698	.2702	.2208	.2211	.2215
61	.2793	.2797	.2801	.2382	.2386	.2390
62	.2898	.2902	.2906	.2575	.2580	.2585
63	.3011	.3015	.3019	.2791	.2797	.2803
64	.3132	.3136	.3141	.3035	.3041	.3047
65	.3263	.3268	.3273	.3310	.3317	.3324
66	.3406	.3411	.3417	.3624	.3632	.3640
67	.3563	.3569	.3575	.3985	.3994	.4004
68	.3737	.3744	.3751	.4406	.4417	.4427
69	.3932	.3940	.3947	.4902	.4914	.4927
70	.4154	.4162	.4170	.5494	.5509	.5524
71	.4409	.4418	.4428	.6216	.6233	.6251
72	.4709	.4719	.4730	.7113	.7134	.7155
73	.5070	.5082	.5094	.8260	.8286	.8312
74	.5519	.5533	.5547	.9778	.9811	.9844
75	.6102	.6119	.6136	1.1885	1.1928	1.1972
76	.6909	.6930	.6951	1.5012	1.5072	1.5131
77	.8138	.6166	.8195	2.0152	2.0240	2.0329
78	1.0361	1.0403	1.0445	3.0232	3.0383	3.0536
79	1.6262	1.6346	1.6431	5.9517	5.9880	6.0245

$\phi°-180°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
0	.0000	.0000	.0000	.0000	.0000	.0000
1	.0015	.0015	.0015	.0000	.0000	.0000
2	.0031	.0031	.0031	.0001	.0001	.0001
3	.0046	.0046	.0046	.0001	.0001	.0001
4	.0061	.0061	.0061	.0002	.0002	.0002
5	.0077	.0077	.0077	.0003	.0003	.0003
6	.0092	.0092	.0092	.0005	.0005	.0005
7	.0108	.0108	.0108	.0007	.0007	.0007
8	.0123	.0123	.0123	.0009	.0009	.0009
9	.0139	.0139	.0139	.0011	.0011	.0011

$\phi°-180°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
10	1.0156	1.0158	1.0159	.0155	.0155	.0155
11	1.0189	1.0191	1.0193	.0171	.0171	.0171
12	1.0226	1.0228	1.0230	.0187	.0187	.0187
13	1.0266	1.0268	1.0270	.0203	.0203	.0203
14	1.0309	1.0311	1.0314	.0219	.0219	.0219
15	1.0356	1.0359	1.0361	.0236	.0236	.0236
16	1.0407	1.0410	1.0412	.0252	.0252	.0252
17	1.0461	1.0464	1.0467	.0269	.0269	.0269
18	1.0520	1.0523	1.0526	.0286	.0286	.0286
19	1.0582	1.0585	1.0588	.0303	.0303	.0303
20	1.0649	1.0652	1.0655	.0321	.0321	.0321
21	1.0719	1.0723	1.0726	.0339	.0339	.0339
22	1.0794	1.0798	1.0802	.0356	.0357	.0357
23	1.0874	1.0878	1.0882	.0375	.0375	.0375
24	1.0958	1.0962	1.0967	.0393	.0393	.0393
25	1.1048	1.1052	1.1056	.0412	.0412	.0412
26	1.1142	1.1146	1.1151	.0431	.0431	.0431
27	1.1241	1.1246	1.1251	.0451	.0451	.0451
28	1.1346	1.1351	1.1356	.0471	.0471	.0471
29	1.1457	1.1462	1.1468	.0491	.0491	.0491
30	1.1574	1.1579	1.1585	.0512	.0512	.0512
31	1.1697	1.1703	1.1709	.0533	.0533	.0533
32	1.1827	1.1833	1.1839	.0555	.0555	.0555
33	1.1963	1.1970	1.1976	.0577	.0577	.0577
34	1.2107	1.2114	1.2121	.0600	.0600	.0600
35	1.2259	1.2266	1.2273	.0624	.0624	.0624
36	1.2418	1.2426	1.2433	.0648	.0648	.0648
37	1.2587	1.2594	1.2602	.0672	.0673	.0673
38	1.2754	1.2772	1.2780	.0698	.0698	.0698
39	1.2951	1.2959	1.2968	.0724	.0725	.0725
40	1.3148	1.3157	1.3165	.0751	.0752	.0752
41	1.3356	1.3365	1.3374	.0780	.0780	.0780
42	1.3575	1.3585	1.3595	.0809	.0809	.0809
43	1.3807	1.3817	1.3828	.0839	.0839	.0839
44	1.4052	1.4063	1.4074	.0870	.0870	.0871
45	1.4311	1.4323	1.4334	.0902	.0903	.0903
46	1.4586	1.4598	1.4609	.0936	.0937	.0937
47	1.4877	1.4889	1.4901	.0971	.0972	.0972
48	1.5185	1.5198	1.5211	.1000	.1008	.1009
49	1.5513	1.5526	1.5540	.1040	.1047	.1047
50	1.5861	1.5875	1.5889	.1087	.1087	.1087
51	1.6231	1.6247	1.6262	.1129	.1129	.1130
52	1.6626	1.6642	1.6658	.1173	.1173	.1174
53	1.7048	1.7065	1.7082	.1220	.1220	.1221
54	1.7499	1.7517	1.7534	.1269	.1269	.1270

$\phi°-180°$	ξ			η		
	$r = 0.01$	$r = 0.02$	$r = 0.03$	$r = 0.01$	$r = 0.02$	$r = 0.03$
10	.0154	.0154	.0154	.0014	.0014	.0014
11	.0170	.0170	.0170	.0017	.0017	.0017
12	.0186	.0186	.0186	.0020	.0020	.0020
13	.0201	.0201	.0201	.0023	.0023	.0023
14	.0217	.0217	.0217	.0027	.0027	.0027
15	.0233	.0233	.0233	.0031	.0031	.0031
16	.0249	.0249	.0249	.0036	.0036	.0036
17	.0265	.0265	.0265	.0040	.0040	.0040
18	.0281	.0281	.0281	.0045	.0045	.0045
19	.0298	.0298	.0298	.0051	.0051	.0051
20	.0314	.0314	.0314	.0057	.0057	.0057
21	.0331	.0331	.0331	.0063	.0063	.0063
22	.0347	.0347	.0348	.0070	.0070	.0070
23	.0364	.0364	.0364	.0076	.0077	.0077
24	.0381	.0381	.0381	.0084	.0084	.0084
25	.0398	.0398	.0399	.0092	.0092	.0092
26	.0416	.0416	.0416	.0100	.0100	.0100
27	.0433	.0433	.0433	.0109	.0109	.0109
28	.0451	.0451	.0451	.0118	.0118	.0118
29	.0469	.0469	.0469	.0128	.0128	.0128
30	.0487	.0487	.0487	.0138	.0138	.0138
31	.0505	.0505	.0505	.0149	.0149	.0149
32	.0524	.0524	.0524	.0160	.0160	.0160
33	.0542	.0543	.0543	.0172	.0172	.0172
34	.0562	.0562	.0562	.0185	.0185	.0185
35	.0581	.0581	.0581	.0198	.0198	.0198
36	.0600	.0601	.0601	.0212	.0212	.0212
37	.0620	.0621	.0621	.0227	.0227	.0227
38	.0641	.0641	.0641	.0242	.0242	.0242
39	.0661	.0662	.0662	.0259	.0259	.0259
40	.0682	.0683	.0683	.0276	.0276	.0276
41	.0704	.0704	.0704	.0294	.0294	.0294
42	.0725	.0726	.0726	.0313	.0313	.0314
43	.0748	.0748	.0748	.0334	.0334	.0334
44	.0770	.0771	.0771	.0355	.0355	.0356
45	.0793	.0794	.0794	.0378	.0378	.0378
46	.0817	.0817	.0818	.0402	.0402	.0402
47	.0841	.0842	.0842	.0427	.0428	.0428
48	.0866	.0866	.0867	.0455	.0455	.0455
49	.0891	.0892	.0892	.0483	.0483	.0484
50	.0917	.0918	.0918	.0514	.0514	.0514
51	.0944	.0945	.0945	.0546	.0547	.0547
52	.0972	.0972	.0973	.0581	.0581	.0582
53	.1000	.1001	.1001	.0618	.0618	.0619
54	.1029	.1030	.1031	.0658	.0658	.0658

$\phi°-180°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
55	1.7982	1.8001	1.8020	.1321	.1322	.1322
56	1.8500	1.8520	1.8540	.1376	.1377	.1378
57	1.9058	1.9079	1.9100	.1435	.1435	.1436
58	1.9658	1.9681	1.9703	.1497	.1498	.1499
59	2.0307	2.0331	2.0355	.1564	.1565	.1566
60	2.1010	2.1036	2.1061	.1636	.1637	.1638
61	2.1774	2.1802	2.1829	.1713	.1714	.1715
62	2.2607	2.2636	2.2665	.1796	.1797	.1798
63	2.3517	2.3548	2.3579	.1886	.1887	.1888
64	2.4516	2.4549	2.4583	.1984	.1985	.1987
65	2.5617	2.5653	2.5689	.2091	.2092	.2094
66	2.6836	2.6875	2.6914	.2208	.2210	.2212
67	2.8193	2.8236	2.8278	.2338	.2340	.2342
68	2.9712	2.9758	2.9804	.2482	.2484	.2487
69	3.1422	3.1473	3.1523	.2644	.2646	.2649
70	3.3363	3.3418	3.3474	.2825	.2828	.2831
71	3.5583	3.5644	3.5705	.3032	.3035	.3038
72	3.8145	3.8214	3.8282	.3269	.3273	.3276
73	4.1136	4.1213	4.1289	.3544	.3548	.3552
74	4.4672	4.4758	4.4845	.3868	.3872	.3877
75	4.8915	4.9013	4.9112	.4254	.4259	.4265
76	5.4098	5.4212	5.4326	.4724	.4730	.4736
77	6.0575	6.0709	6.0842	.5308	.5316	.5323
78	6.8893	6.9054	6.9214	.6056	.6065	.6074
79	7.9971	8.0168	8.0365	.7047	.7059	.7071
80	9.5456	9.5706	9.5956	.8429	.8445	.8460
81	11.8626	11.8959	11.9294	1.0490	1.0511	1.0532
82	15.7119	15.7599	15.8082	1.3905	1.3936	1.3967
83	23.3745	23.4543	23.5344	2.0686	2.0739	2.0792
84	46.1809	46.3664	46.5527	4.0822	4.0951	4.1080

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$\phi°-180°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
55	.1060	.1060	.1061	.0700	.0700	.0701
56	.1091	.1092	.1092	.0745	.0746	.0746
57	.1123	.1124	.1125	.0794	.0795	.0795
58	.1157	.1158	.1158	.0847	.0848	.0848
59	.1192	.1193	.1193	.0904	.0905	.0905
60	.1228	.1229	.1230	.0966	.0966	.0967
61	.1266	.1267	.1268	.1033	.1033	.1034
62	.1306	.1307	.1307	.1106	.1106	.1108
63	.1347	.1348	.1349	.1185	.1186	.1188
64	.1391	.1392	.1393	.1273	.1274	.1276
65	.1437	.1438	.1439	.1370	.1371	.1372
66	.1486	.1487	.1488	.1477	.1478	.1480
67	.1537	.1539	.1540	.1596	.1597	.1599
68	.1593	.1594	.1595	.1729	.1731	.1733
69	.1652	.1653	.1654	.1879	.1881	.1883
70	.1715	.1717	.1718	.2049	.2052	.2054
71	.1784	.1786	.1787	.2244	.2247	.2250
72	.1859	.1861	.1863	.2469	.2472	.2475
73	.1942	.1944	.1946	.2731	.2735	.2739
74	.2034	.2036	.2038	.3042	.3046	.3050
75	.2137	.2139	.2142	.3414	.3419	.3424
76	.2254	.2257	.2260	.3869	.3874	.3880
77	.2391	.2394	.2396	.4437	.4444	.4451
78	.2552	.2555	.2559	.5167	.5176	.5184
79	.2749	.2753	.2757	.6139	.6150	.6161
80	.3001	.3005	.3009	.7498	.7512	.7527
81	.3339	.3345	.3350	.9531	.9551	.9571
82	.3841	.3848	.3855	1.2908	1.2938	1.2968
83	.4719	.4728	.4738	1.9632	1.9684	1.9736
84	.6960	.6978	.6996	3.9643	3.9770	3.9897

TABLE 3 - QUADRANT 2

Reference Point at $\phi = 180°$

180°-φ	τ			ε		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
0	1.0000	1.0000	1.0000	.0000	.0000	.0000
1	.9738	.9560	.9346	2.2340	2.2091	2.1848
2	.9572	.9171	.8780	4.2833	4.1723	4.0840
3	.9411	.8836	.8315	6.0027	5.8286	5.6496
4	.9274	.8564	.7946	7.4418	7.1650	6.9019
5	.9164	.8375	.7654	8.6130	8.8422	7.9937
6	.9075	.8268	.7424	9.5634	9.2063	8.6784
7	.9008	.8075	.7241	10.3386	9.8044	9.3072
8	.8947	.7966	.7093	10.9767	10.3746	9.8166
9	.8900	.7878	.6972	11.5074	10.8458	10.2349
10	.8861	.7804	.6872	11.9540	11.2401	10.5830
11	.8828	.7742	.6789	12.3337	11.5738	10.8763
12	.8801	.7689	.6717	12.6600	11.8594	11.1263
13	.8777	.7643	.6656	12.9428	12.1060	11.3414
14	.8757	.7604	.6604	13.1902	12.3212	11.5285
15	.8739	.7570	.6557	13.4083	12.5103	11.6925
16	.8724	.7540	.6517	13.6019	12.6779	11.8375
17	.8710	.7513	.6461	13.7747	12.8273	11.9665
18	.8698	.7490	.6449	13.9306	12.9614	12.0821
19	.8687	.7468	.6430	14.0718	13.0824	12.1862
20	.8678	.7449	.6394	14.1991	13.1923	12.2806
21	.8669	.7432	.6371	14.3157	13.2983	12.3664
22	.8662	.7416	.6350	14.4228	13.3840	12.4450
23	.8655	.7402	.6330	14.5212	13.4683	12.5171
24	.8648	.7388	.6312	14.6123	13.5461	12.5836
25	.8643	.7376	.6296	14.6966	13.6181	12.6451
26	.8637	.7363	.6280	14.7751	13.6851	12.7022
27	.8632	.7353	.6266	14.8483	13.7474	12.7554
28	.8628	.7345	.6253	14.9168	13.8056	12.8051
29	.8624	.7336	.6241	14.9810	13.8605	12.8516
30	.8620	.7328	.6229	15.0415	13.9119	12.8953
31	.8617	.7320	.6219	15.0934	13.9603	12.9364
32	.8613	.7313	.6208	15.1523	14.0060	12.9753
33	.8610	.7306	.6199	15.2031	14.0493	13.0119
34	.8608	.7299	.6190	15.2515	14.0908	13.0467
35	.8605	.7293	.6181	15.2974	14.1291	13.0797
36	.8603	.7287	.6173	15.3412	14.1663	13.1111
37	.8600	.7282	.6166	15.3838	14.2015	13.1410
38	.8598	.7277	.6159	15.4228	14.2353	13.1696
39	.8596	.7272	.6152	15.4608	14.2675	13.1969
40	.8594	.7267	.6145	15.4974	14.2985	13.2231
41	.8592	.7263	.6139	15.5325	14.3281	13.2481
42	.8591	.7258	.6133	15.5662	14.3566	13.2722
43	.8589	.7254	.6127	15.5986	14.3840	13.2953
44	.8588	.7251	.6122	15.6300	14.4104	13.3177
45	.8586	.7247	.6116	15.6601	14.4359	13.3391
46	.8585	.7243	.6111	15.6893	14.4605	13.3599
47	.8584	.7240	.6106	15.7174	14.4842	13.3800
48	.8583	.7236	.6101	15.7448	14.5073	13.3994
49	.8581	.7233	.6097	15.7712	14.5296	13.4182

180°−φ°	ξ			η		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
0	.0000	.0000	.0000	.0000	.0000	.0000
1	− 2.2339	− 2.2089	− 2.1844	.0193	.0190	.0187
2	− 4.2523	− 4.1715	− 4.0832	.0720	.0700	.0680
3	− 6.0002	− 5.8201	− 5.6474	.1475	.1415	.1358
4	− 7.4367	− 7.1601	− 6.8973	.2349	.2230	.2118
5	− 8.6042	− 8.2339	− 7.8851	.3264	.3072	.2892
6	− 9.5503	− 9.0942	− 8.6672	.4172	.3897	.3643
7	−10.3205	− 9.7878	− 9.2919	.5048	.4686	.4352
8	−10.9531	−10.3532	− 9.7970	.5879	.5428	.5016
9	−11.4781	−10.8191	−10.2107	.6662	.6123	.5633
10	−11.9186	−11.2081	−10.5541	.7398	.6773	.6207
11	−12.2919	−11.5361	−10.8424	.8089	.7381	.6740
12	−12.6116	−11.8160	−11.0874	.8739	.7949	.7238
13	−12.8878	−12.0568	−11.2974	.9350	.8483	.7703
14	−13.1284	−12.2661	−11.4794	.9927	.8985	.8140
15	−13.3395	−12.4491	−11.6382	1.0473	.9458	.8550
16	−13.5261	−12.6107	−11.7779	1.0990	.9905	.8937
17	−13.6920	−12.7538	−11.9016	1.1481	1.0329	.9304
18	−13.8404	−12.8819	−12.0119	1.1949	1.0732	.9651
19	−13.9738	−12.9965	−12.1106	1.2395	1.1116	.9981
20	−14.0944	−13.1002	−12.1996	1.2822	1.1483	1.0296
21	−14.2036	−13.1938	−12.2800	1.3230	1.1833	1.0597
22	−14.3032	−13.2792	−12.3531	1.3622	1.2169	1.0884
23	−14.3942	−13.3570	−12.4197	1.3999	1.2491	1.1160
24	−14.4777	−13.4284	−12.4807	1.4362	1.2801	1.1425
25	−14.5544	−13.4939	−12.5366	1.4712	1.3100	1.1680
26	−14.6253	−13.5544	−12.5882	1.5050	1.3388	1.1926
27	−14.6908	−13.6101	−12.6358	1.5376	1.3667	1.2163
28	−14.7516	−13.6620	−12.6799	1.5692	1.3936	1.2393
29	−14.8080	−13.7099	−12.7207	1.5999	1.4197	1.2615
30	−14.8606	−13.7548	−12.7588	1.6296	1.4450	1.2830
31	−14.9096	−13.7964	−12.7942	1.6585	1.4695	1.3039
32	−14.9556	−13.8355	−12.8273	1.6866	1.4934	1.3241
33	−14.9985	−13.8718	−12.8582	1.7140	1.5166	1.3438
34	−15.0388	−13.9061	−12.8873	1.7407	1.5393	1.3630
35	−15.0766	−13.9381	−12.9144	1.7667	1.5613	1.3817
36	−15.1123	−13.9684	−12.9400	1.7921	1.5828	1.4000
37	−15.1458	−13.9966	−12.9640	1.8169	1.6038	1.4178
38	−15.1774	−14.0235	−12.9867	1.8411	1.6244	1.4352
39	−15.2072	−14.0487	−13.0081	1.8649	1.6445	1.4521
40	−15.2355	−14.0726	−13.0283	1.8881	1.6641	1.4688
41	−15.2621	−14.0951	−13.0473	1.9109	1.6834	1.4850
42	−15.2874	−14.1165	−13.0654	1.9333	1.7023	1.5010
43	−15.3113	−14.1366	−13.0824	1.9552	1.7208	1.5167
44	−15.3340	−14.1559	−13.0986	1.9767	1.7390	1.5320
45	−15.3555	−14.1739	−13.1139	1.9978	1.7568	1.5471
46	−15.3760	−14.1913	−13.1285	2.0186	1.7744	1.5619
47	−15.3954	−14.2076	−13.1423	2.0391	1.7916	1.5764
48	−15.4139	−14.2233	−13.1555	2.0592	1.8086	1.5908
49	−15.4313	−14.2379	−13.1679	2.0790	1.8253	1.6048

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180°-φ°	τ			σ		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
50	.8580	.7230	.6093	15.7969	14.5513	13.4365
51	.8579	.7227	.6088	15.8218	14.5722	13.4541
52	.8578	.7224	.6084	15.8461	14.5927	13.4714
53	.8577	.7222	.6080	15.8697	14.6126	13.4881
54	.8577	.7219	.6076	15.8928	14.6320	13.5044
55	.8576	.7216	.6072	15.9152	14.6508	13.5203
56	.8575	.7214	.6069	15.9371	14.6693	13.5358
57	.8574	.7211	.6065	15.9584	14.6872	13.5509
58	.8573	.7209	.6062	15.9794	14.7049	13.5658
59	.8573	.7207	.6058	15.9998	14.7220	13.5802
60	.8572	.7204	.6055	16.0199	14.7389	13.5944
61	.8571	.7202	.6052	16.0395	14.7554	13.6082
62	.8571	.7200	.6049	16.0589	14.7716	13.6219
63	.8570	.7198	.6045	16.0777	14.7875	13.6352
64	.8569	.7196	.6042	16.0964	14.8032	13.6484
65	.8569	.7194	.6039	16.1146	14.8185	13.6612
66	.8568	.7192	.6036	16.1327	14.8336	13.6739
67	.8568	.7190	.6034	16.1503	14.8484	13.6864
68	.8567	.7189	.6031	16.1678	14.8631	13.6987
69	.8567	.7186	.6028	16.1850	14.8775	13.7108
70	.8566	.7184	.6025	16.2021	14.8918	13.7228
71	.8566	.7182	.6023	16.2188	14.9058	13.7345
72	.8565	.7181	.6020	16.2354	14.9198	13.7462
73	.8565	.7179	.6017	16.2518	14.9335	13.7577
74	.8564	.7177	.6015	16.2680	14.9471	13.7691
75	.8564	.7176	.6012	16.2840	14.9605	13.7804
76	.8564	.7174	.6010	16.3000	14.9739	13.7916
77	.8563	.7172	.6007	16.3157	14.9871	13.8026
78	.8563	.7171	.6005	16.3314	15.0003	13.8136
79	.8562	.7169	.6002	16.3469	15.0132	13.8245
80	.8562	.7167	.6000	16.3624	15.0262	13.8354
81	.8562	.7166	.5997	16.3777	15.0390	13.8461
82	.8561	.7164	.5995	16.3930	15.0518	13.8568
83	.8561	.7163	.5993	16.4082	15.0645	13.8674
84	.8561	.7161	.5990	16.4233	15.0772	13.8780
85	.8560	.7159	.5988	16.4383	15.0897	13.8885
86	.8560	.7158	.5986	16.4534	15.1023	13.8991
87	.8559	.7156	.5983	16.4684	15.1148	13.9095
88	.8559	.7155	.5981	16.4834	15.1274	13.9200
89	.8559	.7153	.5978	16.4983	15.1398	13.9304
90	.8558	.7152	.5976	16.5132	15.1523	13.9409

$180°-\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
50	-15.4481	-14.2521	-13.1798	2.0556	1.7414	1.6187
51	-15.4639	-14.2653	-13.1910	2.1128	1.8580	1.6324
52	-15.4790	-14.2782	-13.2013	2.1368	1.8740	1.6458
53	-15.4934	-14.2902	-13.2110	2.1555	1.8897	1.6591
54	-15.5071	-14.3015	-13.2217	2.1740	1.9053	1.6722
55	-15.5201	-14.3126	-13.2308	2.1923	1.9207	1.6852
56	-15.5325	-14.3232	-13.2397	2.2103	1.9359	1.6980
57	-15.5443	-14.3330	-13.2480	2.2282	1.9509	1.7106
58	-15.5556	-14.3426	-13.2560	2.2458	1.9657	1.7231
59	-15.5662	-14.3515	-13.2633	2.2633	1.9804	1.7354
60	-15.5765	-14.3601	-13.2707	2.2806	1.9949	1.7476
61	-15.5861	-14.3681	-13.2775	2.2977	2.0093	1.7597
62	-15.5953	-14.3760	-13.2840	2.3146	2.0235	1.7716
63	-15.6040	-14.3832	-13.2902	2.3314	2.0376	1.7835
64	-15.6124	-14.3903	-13.2961	2.3480	2.0516	1.7952
65	-15.6202	-14.3968	-13.3016	2.3645	2.0654	1.8068
66	-15.6277	-14.4032	-13.3069	2.3809	2.0792	1.8184
67	-15.6347	-14.4090	-13.3118	2.3971	2.0928	1.8298
68	-15.6415	-14.4147	-13.3166	2.4133	2.1064	1.8412
69	-15.6471	-14.4199	-13.3210	2.4293	2.1198	1.8524
70	-15.6537	-14.4250	-13.3252	2.4452	2.1331	1.8637
71	-15.6593	-14.4296	-13.3291	2.4610	2.1464	1.8748
72	-15.6646	-14.4341	-13.3328	2.4768	2.1596	1.8858
73	-15.6695	-14.4381	-13.3362	2.4924	2.1727	1.8968
74	-15.6741	-14.4421	-13.3395	2.5079	2.1857	1.9077
75	-15.6784	-14.4456	-13.3425	2.5234	2.1987	1.9186
76	-15.6824	-14.4491	-13.3453	2.5388	2.2116	1.9294
77	-15.6860	-14.4520	-13.3479	2.5542	2.2245	1.9402
78	-15.6895	-14.4550	-13.3503	2.5695	2.2373	1.9509
79	-15.6925	-14.4574	-13.3524	2.5847	2.2500	1.9616
80	-15.6954	-14.4599	-13.3544	2.5999	2.2627	1.9722
81	-15.6979	-14.4619	-13.3562	2.6150	2.2754	1.9828
82	-15.7002	-14.4639	-13.3578	2.6301	2.2880	1.9934
83	-15.7021	-14.4655	-13.3591	2.6451	2.3006	2.0039
84	-15.7039	-14.4670	-13.3604	2.6602	2.3132	2.0144
85	-15.7053	-14.4681	-13.3613	2.6752	2.3257	2.0249
86	-15.7065	-14.4692	-13.3622	2.6901	2.3383	2.0354
87	-15.7074	-14.4698	-13.3628	2.7051	2.3508	2.0459
88	-15.7081	-14.4705	-13.3633	2.7200	2.3633	2.0563
89	-15.7084	-14.4707	-13.3635	2.7350	2.3757	2.0667
90	-15.7086	-14.4710	-13.3637	2.7499	2.3882	2.0772

$$\phi_c = 10°$$

$180°-\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
0	1.0000	1.0000	1.0000	.0000	.0000	.0000
1	.9945	.9889	.9832	.5666	.5650	.5634
2	.9894	.9783	.9674	1.1194	1.1131	1.1069
3	.9848	.9686	.9526	1.6493	1.6357	1.6223
4	.9807	.9597	.9391	2.1493	2.1262	2.1035
5	.9772	.9517	.9268	2.6150	2.5809	2.5473
6	.9742	.9446	.9158	3.0443	2.9980	2.9526
7	.9716	.9383	.9061	3.4371	3.3781	3.3204
8	.9694	.9328	.8974	3.7946	3.7226	3.6525
9	.9677	.9279	.8898	4.1189	4.0342	3.9518
10	.9662	.9237	.8831	4.4129	4.3156	4.2213
11	.9650	.9201	.8772	4.6791	4.5699	4.4640
12	.9641	.9169	.8719	4.9206	4.7998	4.6829
13	.9634	.9141	.8673	5.1399	5.0081	4.8808
14	.9628	.9116	.8632	5.3394	5.1972	5.0601
15	.9624	.9095	.85	5.5215	5.3694	5.2230
16	.9621	.9077	.85	5.6879	5.5266	5.3714
17	.9619	.9060	.8521	5.8406	5.6705	5.5071
18	.9617	.9046	.8509	5.9810	5.8027	5.6314
19	.9617	.9034	.8485	6.1104	5.9243	5.7458
20	.9617	.9023	.8464	6.2301	6.0367	5.8513
21	.9618	.9013	.8446	6.3411	6.1407	5.9488
22	.9619	.9004	.8429	6.4442	6.2373	6.0393
23	.9621	.8997	.8413	6.5403	6.3273	6.1235
24	.9623	.8990	.8399	6.6301	6.4112	6.2019
25	.9625	.8985	.8387	6.7142	6.4897	6.2752
26	.9628	.8980	.8375	6.7931	6.5633	6.3439
27	.9631	.8975	.8365	6.8673	6.6325	6.4084
28	.9633	.8971	.8355	6.9373	6.6977	6.4691
29	.9636	.8968	.8346	7.0034	6.7592	6.5264
30	.9640	.8965	.8338	7.0659	6.8174	6.5805
31	.9643	.8963	.8331	7.1251	6.8725	6.6317
32	.9646	.8961	.8324	7.1814	6.9248	6.6803
33	.9650	.8959	.8318	7.2350	6.9745	6.7265
34	.9653	.8957	.8312	7.2860	7.0219	6.7705
35	.9657	.8956	.8307	7.3347	7.0671	6.8124
36	.9660	.8955	.8302	7.3813	7.1102	6.8524
37	.9664	.8955	.8297	7.4258	7.1515	6.8907
38	.9668	.8954	.8293	7.4686	7.1911	6.9274
39	.9672	.8954	.8289	7.5096	7.2291	6.9625
40	.9675	.8953	.8286	7.5490	7.2656	6.9963
41	.9679	.8953	.8282	7.5870	7.3007	7.0288
42	.9683	.8954	.8279	7.6235	7.3345	7.0601
43	.9687	.8954	.8276	7.6588	7.3672	7.0903
44	.9690	.8954	.8274	7.6929	7.3987	7.1194

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$180°-\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
0	.0000	.0000	.0000	.0000	.0000	.0000
1	- .5666	- .5650	- .5634	.0049	.0049	.0049
2	-1.1192	-1.1129	-1.1067	.0194	.0192	.0191
3	-1.6486	-1.6350	-1.6215	.0425	.0420	.0415
4	-2.1477	-2.1246	-2.1019	.0729	.0719	.0708
5	-2.6119	-2.5778	-2.5443	.1094	.1075	.1056
6	-3.0392	-2.9931	-2.9478	.1505	.14 4	.1444
7	-3.4295	-3.3707	-3.3132	.1949	.1904	.1860
8	-3.7839	-3.7123	-3.6425	.2415	.2353	.2293
9	-4.1047	-4.0205	-3.9385	.2894	.2813	.2735
10	-4.3946	-4.2980	-4.2043	.3379	.3277	.3179
11	-4.6564	-4.5480	-4.4429	.3864	.3740	.3621
12	-4.8930	-4.7733	-4.6574	.4345	.4198	.4057
13	-5.1071	-4.9767	-4.8506	.4819	.4649	.4485
14	-5.3012	-5.1606	-5.0250	.5285	.5090	.4903
15	-5.4774	-5.3273	-5.1827	.5740	.5521	.5311
16	-5.6376	-5.4788	-5.3257	.6185	.5941	.5707
17	-5.7842	-5.6168	-5.4558	.6618	.6349	.6093
18	-5.9181	-5.7428	-5.5744	.7040	.6747	.6466
19	-6.0409	-5.8582	-5.6829	.7451	.7133	.6829
20	-6.1537	-5.9641	-5.7823	.7850	.7508	.7181
21	-6.2576	-6.0616	-5.8737	.8239	.7872	.7523
22	-6.3536	-6.1514	-5.9579	.8617	.8226	.7854
23	-6.4424	-6.2345	-6.0356	.8984	.8570	.8176
24	-6.5247	-6.3115	-6.1075	.9342	.8904	.8489
25	-6.6013	-6.3829	-6.1743	.9691	.9230	.8793
26	-6.6725	-6.4494	-6.2363	1.0031	.9547	.9089
27	-6.7389	-6.5113	-6.2940	1.0362	.9856	.9376
28	-6.8010	-6.5691	-6.3479	1.0685	1.0156	.9657
29	-6.8590	-6.6232	-6.3982	1.1000	1.0450	.9930
30	-6.9134	-6.6738	-6.4453	1.1308	1.0736	1.0196
31	-6.9645	-6.7213	-6.4894	1.1609	1.1016	1.0456
32	-7.0125	-6.7659	-6.5309	1.1903	1.1289	1.0710
33	-7.0577	-6.8078	-6.5698	1.2190	1.1556	1.0958
34	-7.1002	-6.8473	-6.6065	1.2472	1.1818	1.1201
35	-7.1404	-6.8846	-6.6410	1.2749	1.2073	1.1438
36	-7.1783	-6.9197	-6.6736	1.3018	1 2324	1.1671
37	-7.2141	-6.9529	-6.7044	1.3283	1.2570	1.1898
38	-7.2480	-6.9843	-6.7335	1.3543	1.2811	1.2121
39	-7.2801	-7.0140	-6.7610	1.3799	1.3047	1.2340
40	-7.3105	-7.0422	-6.7871	1.4049	1.3279	1.2555
41	-7.3394	-7.0689	-6.8118	1.4296	1.3507	1.2766
42	-7.3668	-7.0942	-6.8352	1.4538	1.3731	1.2974
43	-7.3928	-7.1183	-6.8574	1.4777	1.3952	1.3177
44	-7.4175	-7.1412	-6.8786	1.5011	1.4169	1.3378

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$180°-\phi°$	r			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
45	.9694	.8955	.8271	7.7259	7.4291	7.1475
46	.9698	.8955	.8269	7.7578	7.4586	7.1748
47	.9702	.8956	.8267	7.7888	7.4872	7.2011
48	.9705	.8956	.8265	7.8188	7.5149	7.2267
49	.9709	.8957	.8263	7.8479	7.5418	7.2515
50	.9713	.8958	.8262	7.8763	7.5679	7.2756
51	.9717	.8959	.8260	7.9038	7.5933	7.2991
52	.9720	.8960	.8259	7.9307	7.6181	7.3219
53	.9724	.8961	.8258	7.9569	7.6422	7.3442
54	.9728	.8962	.8257	7.9824	7.6658	7.3658
55	.9732	.8963	.8255	8.0074	7.6888	7.3870
56	.9735	.8964	.8254	8.0318	7.7112	7.4077
57	.9739	.8966	.8254	8.0557	7.7332	7.4279
58	.9743	.8967	.8253	8.0790	7.7547	7.4477
59	.9746	.8968	.8252	8.1019	7.7758	7.4671
60	.9750	.8969	.8251	8.1243	7.7964	7.4861
61	.9754	.8971	.8251	8.1464	7.8167	7.5048
62	.9757	.8972	.8250	8.1680	7.8366	7.5231
63	.9761	.8974	.8250	8.1893	7.8561	7.5410
64	.9765	.8975	.8249	8.2102	7.8754	7.5587
65	.9768	.8976	.8249	8.2308	7.8943	7.5761
66	.9772	.8978	.8248	8.2511	7.9129	7.5932
67	.9776	.8979	.8248	8.2711	7.9313	7.6101
68	.9779	.8981	.8248	8.2908	7.9494	7.6267
69	.9783	.8982	.8247	8.3103	7.9673	7.6432
70	.9786	.8984	.8247	8.3295	7.9849	7.6594
71	.9790	.8986	.8247	8.3485	8.0024	7.6754
72	.9794	.8987	.8247	8.3673	8.0196	7.6912
73	.9797	.8989	.8247	8.3859	8.0367	7.7069
74	.9801	.8990	.8247	8.4043	8.0536	7.7224
75	.9804	.8992	.8247	8.4226	8.0704	7.7378
76	.9808	.8993	.8247	8.4407	8.0870	7.7530
77	.9811	.8995	.8247	8.4587	8.1035	7.7681
78	.9815	.8997	.8247	8.4765	8.1198	7.7831
79	.9819	.8998	.8247	8.4943	8.1361	7.7980
80	.9822	.9000	.8247	8.5119	8.1522	7.8128
81	.9826	.9002	.8247	8.5294	8.1683	7.8275
82	.9829	.9003	.8247	8.5469	8.1843	7.8422
83	.9833	.9005	.8247	8.5643	8.2002	7.8567
84	.9836	.9006	.8247	8.5816	8.2161	7.8713
85	.9840	.9008	.8247	8.5989	8.2319	7.8858
86	.9843	.9010	.8247	8.6161	8.2477	7.9002
87	.9847	.9011	.8247	8.6333	8.2634	7.9146
88	.9850	.9013	.8247	8.6505	8.2792	7.9290
89	.9854	.9015	.8247	8.6677	8.2949	7.9434
90	.9857	.9016	.8247	8.6849	8.3106	7.9578

Table 3

$180°-\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
45	-7.4410	-7.1620	-6.8936	1.5242	1.4362	1.3575
46	-7.4634	-7.1835	-6.9177	1.5470	1.4592	1.3769
47	-7.4847	-7.2032	-6.9359	1.5694	1.4800	1.3960
48	-7.5050	-7.2219	-6.9531	1.5916	1.5004	1.4149
49	-7.5243	-7.2398	-6.9696	1.6134	1.5205	1.4335
50	-7.5427	-7.2567	-6.9852	1.6349	1.5404	1.4518
51	-7.5603	-7.2729	-7.0002	1.6562	1.5600	1.4699
52	-7.5770	-7.2883	-7.0144	1.6772	1.5794	1.4878
53	-7.5929	-7.3030	-7.0279	1.6980	1.5986	1.5054
54	-7.6081	-7.3170	-7.0408	1.7186	1.6175	1.5229
55	-7.6226	-7.3304	-7.0531	1.7389	1.6362	1.5401
56	-7.6364	-7.3431	-7.0648	1.7590	1.6547	1.5572
57	-7.6496	-7.3552	-7.0760	1.7789	1.6730	1.5740
58	-7.6621	-7.3668	-7.0866	1.7986	1.6912	1.5907
59	-7.6741	-7.3778	-7.0968	1.8181	1.7091	1.6072
60	-7.6855	-7.3883	-7.1064	1.8374	1.7269	1.6236
61	-7.6964	-7.3982	-7.1156	1.8566	1.7446	1.6398
62	-7.7067	-7.4077	-7.1243	1.8756	1.7620	1.6559
63	-7.7165	-7.4168	-7.1326	1.8945	1.7794	1.6719
64	-7.7258	-7.4254	-7.1405	1.9132	1.7966	1.6877
65	-7.7347	-7.4335	-7.1480	1.9318	1.8137	1.7034
66	-7.7431	-7.4412	-7.1551	1.9502	1.8306	1.7190
67	-7.7511	-7.4485	-7.1618	1.9686	1.8475	1.7344
68	-7.7586	-7.4555	-7.1682	1.9868	1.8642	1.7498
69	-7.7656	-7.4620	-7.1742	2.0049	1.8808	1.7651
70	-7.7725	-7.4632	-7.1799	2.0229	1.8974	1.7803
71	-7.7789	-7.4740	-7.1852	2.0408	1.9138	1.7954
72	-7.7846	-7.4795	-7.1903	2.0587	1.9302	1.8104
73	-7.7904	-7.4847	-7.1950	2.0764	1.9465	1.8253
74	-7.7956	-7.4895	-7.1994	2.0941	1.9627	1.8402
75	-7.8005	-7.4939	-7.2035	2.1117	1.9788	1.8550
76	-7.8051	-7.4981	-7.2073	2.1292	1.9949	1.8697
77	-7.8093	-7.5019	-7.2108	2.1467	2.0109	1.8844
78	-7.8131	-7.5055	-7.2141	2.1641	2.0269	1.8991
79	-7.8167	-7.5087	-7.2170	2.1815	2.0428	1.9137
80	-7.8199	-7.5117	-7.2197	2.1988	2.0587	1.9282
81	-7.8228	-7.5143	-7.2222	2.2161	2.0746	1.9427
82	-7.8253	-7.5167	-7.2243	2.2334	2.0904	1.9572
83	-7.8276	-7.5188	-7.2262	2.2506	2.1062	1.9717
84	-7.8296	-7.5206	-7.2279	2.2678	2.1219	1.9861
85	-7.8312	-7.5221	-7.2293	2.2850	2.1377	2.0005
86	-7.8326	-7.5233	-7.2304	2.3022	2.1534	2.0149
87	-7.8336	-7.5243	-7.2313	2.3194	2.1691	2.0293
88	-7.8344	-7.5250	-7.2319	2.3366	2.1848	2.0437
89	-7.8348	-7.5254	-7.2323	2.3538	2.2006	2.0581
90	-7.8350	-7.5255	-7.2324	2.3710	2.2163	2.0725

$$\phi_c = 15°$$

$180° - \phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
0	1.0000	1.0000	1.0000	.0000	.0000	.0000
1	.9976	.9951	.9926	.2510	.2507	.2504
2	.9956	.9906	.9857	.4994	.4981	.4969
3	.9939	.9865	.9792	.7432	.7404	.7377
4	.9925	.9828	.9732	.9807	.9759	.9712
5	.9915	.9795	.9677	1.2106	1.2033	1.1961
6	.9907	.9766	.9626	1.4318	1.4215	1.4114
7	.9903	.9741	.9581	1.6433	1.6298	1.6165
8	.9901	.9719	.9540	1.8447	1.8277	1.8109
9	.9901	.9701	.9504	2.0358	2.0151	1.9947
10	.9904	.9685	.9472	2.2165	2.1920	2.1678
11	.9909	.9673	.9443	2.3870	2.3586	2.3306
12	.9915	.9663	.9419	2.5476	2.5153	2.4835
13	.9922	.9656	.9397	2.6988	2.6625	2.6268
14	.9931	.9651	.9379	2.8409	2.8007	2.7612
15	.9941	.9647	.9363	2.9745	2.9304	2.8872
16	.9952	.9646	.9349	3.1001	3.0522	3.0053
17	.9963	.9645	.9338	3.2182	3.1666	3.1162
18	.9975	.9646	.9328	3.3293	3.2742	3.2202
19	.9988	.9648	.9320	3.4340	3.3754	3.3180
20	1.0001	.9651	.9314	3.5327	3.4706	3.4100
21	1.0014	.9655	.9309	3.6258	3.5605	3.4967
22	1.0027	.9660	.9305	3.7138	3.6452	3.5784
23	1.0041	.9665	.9303	3.7970	3.7254	3.6555
24	1.0055	.9671	.9301	3.8758	3.8012	3.7285
25	1.0069	.9677	.9300	3.9505	3.8730	3.7975
26	1.0083	.9684	.9300	4.0214	3.9412	3.8630
27	1.0097	.9691	.9301	4.0889	4.0059	3.9252
28	1.0111	.9698	.9302	4.1531	4.0675	3.9843
29	1.0126	.9706	.9303	4.2143	4.1262	4.0405
30	1.0140	.9714	.9306	4.2727	4.1822	4.0941
31	1.0154	.9722	.9308	4.3285	4.2356	4.1453
32	1.0168	.9730	.9311	4.3819	4.2867	4.1943
33	1.0182	.9739	.9315	4.4331	4.3357	4.2411
34	1.0196	.9747	.9318	4.4821	4.3826	4.2860
35	1.0209	.9756	.9322	4.5292	4.4276	4.3290
36	1.0223	.9765	.9327	4.5745	4.4709	4.3704
37	1.0237	.9773	.9331	4.6181	4.5125	4.4101
38	1.0250	.9782	.9336	4.6602	4.5526	4.4484
39	1.0264	.9791	.9341	4.7007	4.5913	4.4853
40	1.0277	.9800	.9346	4.7398	4.6286	4.5209
41	1.0290	.9809	.9351	4.7776	4.6647	4.5553
42	1.0303	.9818	.9356	4.8142	4.6996	4.5885
43	1.0317	.9827	.9362	4.8497	4.7334	4.6207
44	1.0329	.9837	.9367	4.8841	4.7661	4.6519

180°-φ°	ℓ			η		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
0	.0000	.0000	.0000	.0000	.0000	.0000
1	- .2510	- .2507	- .2504	.0022	.0022	.0022
2	- .4993	- .4980	- .4968	.0087	.0087	.0086
3	- .7428	- .7401	- .7373	.0193	.0192	.0191
4	- .9800	- .9752	- .9704	.0338	.0336	.0334
5	-1.2092	-1.2018	-1.1946	.0518	.0514	.0510
6	-1.4293	-1.4190	-1.4089	.0730	.0723	.0716
7	-1.6394	-1.6260	-1.6127	.0969	.0959	.0948
8	-1.8391	-1.8232	-1.8055	.1232	.1217	.1202
9	-2.0281	-2.0075	-1.9872	.1514	.1494	.1473
10	-2.2063	-2.1820	-2.1580	.1813	.1785	.1759
11	-2.3740	-2.3458	-2.3181	.2123	.2089	.2055
12	-2.5314	-2.4993	-2.4678	.2443	.2401	.2360
13	-2.6790	-2.6431	-2.6078	.2770	.2720	.2670
14	-2.8171	-2.7774	-2.7385	.3102	.3042	.2984
15	-2.9465	-2.9030	-2.8605	.3436	.3367	.3299
16	-3.0675	-3.0204	-2.9743	.3772	.3692	.3615
17	-3.1807	-3.1301	-3.0806	.4107	.4017	.3929
18	-3.2868	-3.2327	-3.1798	.4441	.4340	.4242
19	-3.3860	-3.3286	-3.2726	.4773	.4661	.4552
20	-3.4791	-3.4185	-3.3593	.5103	.4979	.4859
21	-3.5663	-3.5026	-3.4404	.5429	.5294	.5163
22	-3.6481	-3.5815	-3.5165	.5751	.5604	.5462
23	-3.7250	-3.6555	-3.5877	.6069	.5911	.5757
24	-3.7973	-3.7250	-3.6546	.6383	.6213	.6048
25	-3.8653	-3.7904	-3.7175	.6693	.6511	.6334
26	-3.9293	-3.8519	-3.7766	.6999	.6804	.6616
27	-3.9896	-3.9099	-3.8322	.7299	.7093	.6894
28	-4.0466	-3.9645	-3.8846	.7596	.7378	.7166
29	-4.1004	-4.0161	-3.9341	.7888	.7658	.7435
30	-4.1512	-4.0648	-3.9808	.8175	.7933	.7699
31	-4.1993	-4.1108	-4.0249	.8459	.8204	.7959
32	-4.2448	-4.1544	-4.0666	.8738	.8472	.8214
33	-4.2880	-4.1957	-4.1061	.9012	.8734	.8466
34	-4.3289	-4.2348	-4.1435	.9283	.8993	.8714
35	-4.3677	-4.2719	-4.1790	.9550	.9248	.8957
36	-4.4046	-4.3072	-4.2126	.9813	.9500	.9197
37	-4.4397	-4.3406	-4.2446	1.0072	.9747	.9434
38	-4.4730	-4.3725	-4.2750	1.0328	.9991	.9667
39	-4.5047	-4.4027	-4.3038	1.0580	1.0232	.9896
40	-4.5349	-4.4315	-4.3313	1.0829	1.0470	1.0123
41	-4.5637	-4.4589	-4.3575	1.1075	1.0704	1.0346
42	-4.5911	-4.4851	-4.3824	1.1318	1.0935	1.0567
43	-4.6172	-4.5100	-4.4061	1.1557	1.1163	1.0784
44	-4.6422	-4.5337	-4.4287	1.1794	1.1388	1.0999

$180° - \phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
45	1.0342	.9846	.9373	4.9174	4.7979	4.6821
46	1.0355	.9855	.9379	4.9499	4.8287	4.7115
47	1.0368	.9864	.9384	4.9814	4.8587	4.7400
48	1.0380	.9873	.9390	5.0120	4.8879	4.7678
49	1.0393	.9882	.9396	5.0419	4.9163	4.7948
50	1.0405	.9891	.9402	5.0710	4.9440	4.8211
51	1.0418	.9900	.9408	5.0995	4.9710	4.8468
52	1.0430	.9909	.9414	5.1272	4.9974	4.8718
53	1.0442	.9918	.9420	5.1543	5.0231	4.8963
54	1.0454	.9927	.9426	5.1808	5.0483	4.9202
55	1.0467	.9936	.9433	5.2068	5.0730	4.9437
56	1.0479	.9945	.9439	5.2323	5.0971	4.9666
57	1.0490	.9954	.9445	5.2572	5.1208	4.9890
58	1.0502	.9963	.9451	5.2817	5.1440	5.0111
59	1.0514	.9972	.9458	5.3057	5.1668	5.0327
60	1.0526	.9981	.9464	5.3293	5.1892	5.0539
61	1.0538	.9990	.9470	5.3525	5.2112	5.0748
62	1.0549	.9999	.9477	5.3754	5.2329	5.0953
63	1.0561	1.0007	.9483	5.3979	5.2542	5.1155
64	1.0572	1.0016	.9489	5.4201	5.2752	5.1354
65	1.0584	1.0025	.9496	5.4419	5.2959	5.1551
66	1.0595	1.0034	.9502	5.4635	5.3163	5.1744
67	1.0607	1.0043	.9509	5.4848	5.3365	5.1935
68	1.0618	1.0051	.9515	5.5058	5.3564	5.2124
69	1.0629	1.0060	.9522	5.5267	5.3761	5.2310
70	1.0641	1.0069	.9528	5.5472	5.3956	5.2495
71	1.0652	1.0078	.9534	5.5676	5.4149	5.2677
72	1.0663	1.0087	.9541	5.5878	5.4340	5.2858
73	1.0675	1.0095	.9547	5.6078	5.4529	5.3037
74	1.0686	1.0104	.9554	5.6277	5.4717	5.3214
75	1.0697	1.0113	.9560	5.6474	5.4903	5.3390
76	1.0708	1.0121	.9567	5.6669	5.5068	5.3565
77	1.0719	1.0130	.9573	5.6864	5.5272	5.3739
78	1.0730	1.0139	.9580	5.7057	5.5455	5.3912
79	1.0742	1.0148	.9586	5.7250	5.5636	5.4083
80	1.0753	1.0156	.9593	5.7441	5.5817	5.4254
81	1.0764	1.0165	.9599	5.7632	5.5998	5.4424
82	1.0775	1.0174	.9606	5.7822	5.6177	5.4594
83	1.0786	1.0182	.9613	5.8012	5.6356	5.4763
84	1.0797	1.0191	.9619	5.8201	5.6535	5.4932
85	1.0808	1.0200	.9626	5.8390	5.6713	5.5100
86	1.0820	1.0209	.9632	5.8579	5.6892	5.5268
87	1.0831	1.0217	.9639	5.8768	5.7070	5.5436
88	1.0842	1.0226	.9645	5.8957	5.7248	5.5604
89	1.0853	1.0235	.9652	5.9146	5.7426	5.5773
90	1.0864	1.0244	.9659	5.9335	5.7605	5.5941

Table 3

$180° - \phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
45	-4.5760	-4.5564	-4.4503	1.2048	1.1611	1.1211
46	-4.6867	-4.5780	-4.4709	1.2259	1.1831	1.1420
47	-4.7104	-4.5987	-4.4905	1.2487	1.2049	1.1627
48	-4.7311	-4.6184	-4.5093	1.2713	1.2264	1.1832
49	-4.7509	-4.6372	-4.5272	1.2937	1.2476	1.2034
50	-4.7695	-4.6552	-4.5443	1.3159	1.2687	1.2234
51	-4.7879	-4.6724	-4.5606	1.3378	1.2895	1.2432
52	-4.8051	-4.6898	-4.5762	1.3595	1.3102	1.2628
53	-4.8217	-4.7045	-4.5911	1.3810	1.3306	1.2822
54	-4.8374	-4.7194	-4.6053	1.4023	1.3509	1.3015
55	-4.8525	-4.7338	-4.6189	1.4235	1.3709	1.3205
56	-4.8669	-4.7474	-4.6319	1.4444	1.3908	1.3394
57	-4.8807	-4.7605	-4.6443	1.4653	1.4106	1.3581
58	-4.8938	-4.7730	-4.6561	1.4859	1.4302	1.3767
59	-4.9064	-4.7849	-4.6674	1.5064	1.4496	1.3952
60	-4.9184	-4.7963	-4.6782	1.5267	1.4689	1.4135
61	-4.9298	-4.8071	-4.6885	1.5469	1.4880	1.4316
62	-4.9407	-4.8174	-4.6983	1.5670	1.5071	1.4497
63	-4.9511	-4.8273	-4.7076	1.5870	1.5260	1.4676
64	-4.9610	-4.8367	-4.7165	1.6068	1.5448	1.4864
65	-4.9704	-4.8456	-4.7249	1.6265	1.5635	1.5031
66	-4.9794	-4.8540	-4.7330	1.6462	1.5821	1.5207
67	-4.9879	-4.8621	-4.7406	1.6657	1.6006	1.5382
68	-4.9959	-4.8697	-4.7478	1.6851	1.6190	1.5557
69	-5.0035	-4.8769	-4.7546	1.7045	1.6373	1.5730
70	-5.0107	-4.8838	-4.7611	1.7238	1.6555	1.5903
71	-5.0176	-4.8902	-4.7672	1.7430	1.6737	1.6075
72	-5.0240	-4.8963	-4.7729	1.7621	1.6918	1.6246
73	-5.0300	-4.9019	-4.7783	1.7812	1.7099	1.6417
74	-5.0356	-4.9073	-4.7833	1.8003	1.7279	1.6587
75	-5.0409	4.9123	-4.7880	1.8193	1.7458	1.6757
76	-5.0458	4.9169	-4.7924	1.8382	1.7637	1.6926
77	-5.0503	-4.9212	-4.7965	1.8571	1.7816	1.7095
78	-5.0545	-4.9251	-4.8002	1.8760	1.7995	1.7264
79	-5.0583	-4.9288	-4.8036	1.8948	1.8173	1.7432
80	-5.0618	-4.9321	-4.8067	1.9137	1.8351	1.7600
81	-5.0650	-4.9350	-4.8095	1.9325	1.8528	1.7768
82	-5.0673	-4.9377	-4.8121	1.9513	1.8706	1.7935
83	-5.0703	-4.9400	-4.8143	1.9701	1.8883	1.8103
84	-5.0724	-4.9420	-4.8162	1.9889	1.9061	1.8271
85	-5.0742	-4.9437	-4.8178	2.0077	1.9239	1.8438
86	-5.0757	-4.9451	-4.8191	2.0265	1.9416	1.8606
87	-5.0769	-4.9462	-4.8201	2.0454	1.9594	1.8774
88	-5.0777	-4.9470	-4.8209	2.0643	1.9772	1.8941
89	-5.0782	-4.9475	-4.8213	2.0832	1.9950	1.9110
90	-5.0785	-4.9476	-4.8215	2.1021	2.0129	1.9278

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$$\phi_c = 20°$$

$180° - \phi$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
0	1.0000	1.0000	1.0000	.0000	.0000	.0000
1	.9988	.9974	.9960	.1400	.1399	.1398
2	.9978	.9950	.9923	.2792	.2788	.2784
3	.9972	.9930	.9889	.4171	.4162	.4153
4	.9969	.9913	.9859	.5530	.5515	.5500
5	.9968	.9900	.9832	.6866	.6842	.6819
6	.9971	.9889	.9809	.8173	.8139	.8106
7	.9976	.9882	.9788	.9448	.9403	.9359
8	.9984	.9877	.9772	1.0688	1.0631	1.0574
9	.9994	.9875	.9758	1.1890	1.1820	1.1750
10	1.0006	.9876	.9748	1.3054	1.2969	1.2884
11	1.0020	.9879	.9740	1.4177	1.4076	1.3977
12	1.0036	.9884	.9734	1.5259	1.5143	1.5028
13	1.0054	.9891	.9731	1.6300	1.6168	1.6037
14	1.0073	.9900	.9730	1.7300	1.7151	1.7004
15	1.0093	.9911	.9731	1.8261	1.8095	1.7931
16	1.0115	.9923	.9734	1.9183	1.9000	1.8819
17	1.0137	.9936	.9739	2.0066	1.9866	1.9668
18	1.0160	.9950	.9745	2.0913	2.0696	2.0481
19	1.0184	.9956	.9752	2.1725	2.1490	2.1259
20	1.0209	.9982	.9761	2.2503	2.2251	2.2001
21	1.0234	1.0000	.9770	2.3249	2.2980	2.2716
22	1.0259	1.0017	.9781	2.3964	2.3679	2.3398
23	1.0285	1.0036	.9793	2.4649	2.4348	2.4052
24	1.0311	1.0055	.9805	2.5307	2.4990	2.4678
25	1.0338	1.0074	.9818	2.5939	2.5606	2.5278
26	1.0364	1.0094	.9831	2.6546	2.6197	2.5854
27	1.0391	1.0114	.9846	2.7129	2.6765	2.6407
28	1.0417	1.0135	.9860	2.7691	2.7311	2.6939
29	1.0444	1.0156	.9875	2.8231	2.7837	2.7450
30	1.0471	1.0176	.9891	2.8751	2.8342	2.7941
31	1.0497	1.0198	.9906	2.9253	2.8830	2.8415
32	1.0524	1.0217	.9922	2.9736	2.9300	2.8871
33	1.0550	1.0240	.9939	3.0204	2.9753	2.9312
34	1.0577	1.0261	.9955	3.0655	3.0191	2.9737
35	1.0603	1.0283	.9972	3.1092	3.0615	3.0147
36	1.0630	1.0304	.9988	3.1514	3.1024	3.0545
37	1.0656	1.0326	1.0005	3.1924	3.1421	3.0929
38	1.0682	1.0347	1.0022	3.2320	3.1805	3.1302
39	1.0708	1.0368	1.0040	3.2705	3.2178	3.1663
40	1.0734	1.0390	1.0057	3.3079	3.2540	3.2013
41	1.0760	1.0411	1.0074	3.3442	3.2892	3.2353
42	1.0785	1.0433	1.0091	3.3795	3.3233	3.2684
43	1.0811	1.0454	1.0109	3.4139	3.3566	3.3005
44	1.0836	1.0475	1.0126	3.4474	3.3890	3.3318

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$180°-\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
0	.0000	.0000	.0000	.0000	.0000	.0000
1	- .1400	- .1399	- .1398	.0012	.0012	.0012
2	- .2792	- .2788	- .2784	.0049	.0049	.0048
3	- .4169	- .4160	- .4151	.0109	.0108	.0106
4	- .5526	- .5510	- .5495	.0192	.0191	.0190
5	- .6857	- .6833	- .6810	.0296	.0295	.0294
6	- .8158	- .8125	- .8092	.0422	.0419	.0417
7	- .9425	- .9381	- .9336	.0566	.0562	.0559
8	-1.0654	-1.0598	-1.0541	.0728	.0723	.0717
9	-1.1844	-1.1773	-1.1704	.0905	.0898	.0891
10	-1.2991	-1.2907	-1.2823	.1097	.1088	.1078
11	-1.4095	-1.3996	-1.3897	.1302	.1290	.1277
12	-1.5156	-1.5041	-1.4927	.1518	.1502	.1487
13	-1.6172	-1.6041	-1.5912	.1743	.1724	.1705
14	-1.7145	-1.6998	-1.6853	.1977	.1954	.1931
15	-1.8075	-1.7912	-1.7750	.2217	.2190	.2163
16	-1.8963	-1.8783	-1.8606	.2463	.2431	.2400
17	-1.9810	-1.9614	-1.9420	.2714	.2677	.2641
18	-2.0618	-2.0405	-2.0196	.2969	.2927	.2886
19	-2.1388	-2.1159	-2.0933	.3226	.3179	.3133
20	-2.2121	-2.1876	-2.1635	.3486	.3433	.3381
21	-2.2820	-2.2559	-2.2302	.3747	.3688	.3630
22	-2.3485	-2.3209	-2.2937	.4009	.3944	.3880
23	-2.4119	-2.3827	-2.3541	.4271	.4200	.4130
24	-2.4722	-2.4416	-2.4115	.4534	.4456	.4380
25	-2.5297	-2.4976	-2.4661	.4796	.4712	.4629
26	-2.5845	-2.5510	-2.5181	.5057	.4966	.4877
27	-2.6367	-2.6018	-2.5676	.5317	.5219	.5124
28	-2.6865	-2.6503	-2.6148	.5576	.5472	.5369
29	-2.7339	-2.6964	-2.6597	.5834	.5722	.5613
30	-2.7792	-2.7405	-2.7025	.6090	.5971	.5855
31	-2.8224	-2.7825	-2.7433	.6345	.6219	.6095
32	-2.8637	-2.8225	-2.7822	.6598	.6464	.6334
33	-2.9031	-2.8608	-2.8193	.6848	.6708	.6570
34	-2.9407	-2.8973	-2.8548	.7098	.6950	.6805
35	-2.9767	-2.9322	-2.8886	.7345	.7189	.7037
36	-3.0111	-2.9656	-2.9209	.7590	.7427	.7268
37	-3.0440	-2.9975	-2.9519	.7834	.7663	.7497
38	-3.0755	-3.0279	-2.9814	.8075	.7897	.7723
39	-3.1056	-3.0571	-3.0097	.8315	.8129	.7948
40	-3.1345	-3.0850	-3.0367	.8553	.8359	.8171
41	-3.1621	-3.1118	-3.0626	.8788	.8588	.8392
42	-3.1895	-3.1374	-3.0873	.9023	.8814	.8611
43	-3.2139	-3.1619	-3.1110	.9255	.9039	.8828
44	-3.2382	-3.1854	-3.1337	.9485	.9262	.9044

/3/

$180°-\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
45	1.0861	1.0496	1.0144	3.4801	3.4205	3.3623
46	1.0886	1.0518	1.0161	3.5119	3.4513	3.3921
47	1.0911	1.0539	1.0179	3.5430	3.4813	3.4211
48	1.0936	1.0560	1.0196	3.5734	3.5106	3.4494
49	1.0961	1.0581	1.0214	3.6031	3.5393	3.4771
50	1.0985	1.0602	1.0231	3.6321	3.5674	3.5042
51	1.1010	1.0623	1.0249	3.6606	3.5948	3.5307
52	1.1034	1.0643	1.0266	3.6885	3.6217	3.5566
53	1.1059	1.0664	1.0284	3.7158	3.6481	3.5820
54	1.1083	1.0685	1.0301	3.7426	3.6740	3.6070
55	1.1107	1.0705	1.0319	3.7690	3.6994	3.6315
56	1.1131	1.0726	1.0336	3.7949	3.7243	3.6555
57	1.1155	1.0747	1.0353	3.8203	3.7488	3.6791
58	1.1178	1.0767	1.0371	3.8454	3.7730	3.7024
59	1.1202	1.0788	1.0388	3.8700	3.7967	3.7252
60	1.1226	1.0808	1.0406	3.8943	3.8201	3.7478
61	1.1249	1.0829	1.0423	3.9183	3.8432	3.7700
62	1.1273	1.0849	1.0441	3.9419	3.8659	3.7919
63	1.1296	1.0869	1.0458	3.9652	3.8884	3.8135
64	1.1320	1.0889	1.0475	3.9883	3.9105	3.8348
65	1.1343	1.0909	1.0493	4.0111	3.9324	3.8559
66	1.1366	1.0930	1.0510	4.0336	3.9541	3.8767
67	1.1389	1.0950	1.0527	4.0559	3.9755	3.8973
68	1.1413	1.0970	1.0545	4.0780	3.9968	3.9177
69	1.1436	1.0990	1.0562	4.0998	4.0178	3.9379
70	1.1459	1.1010	1.0579	4.1215	4.0386	3.9580
71	1.1482	1.1030	1.0597	4.1431	4.0593	3.9778
72	1.1505	1.1051	1.0614	4.1644	4.0799	3.9976
73	1.1528	1.1071	1.0631	4.1857	4.1002	4.0171
74	1.1551	1.1091	1.0649	4.2068	4.1205	4.0366
75	1.1574	1.1111	1.0666	4.2277	4.1406	4.0559
76	1.1597	1.1131	1.0684	4.2486	4.1607	4.0752
77	1.1620	1.1151	1.0701	4.2694	4.1806	4.0943
78	1.1644	1.1171	1.0719	4.2901	4.2005	4.1134
79	1.1667	1.1192	1.0736	4.3108	4.2203	4.1324
80	1.1690	1.1212	1.0754	4.3314	4.2401	4.1513
81	1.1713	1.1232	1.0771	4.3519	4.2598	4.1703
82	1.1736	1.1252	1.0789	4.3725	4.2795	4.1891
83	1.1760	1.1273	1.0806	4.3930	4.2992	4.2080
84	1.1783	1.1293	1.0824	4.4135	4.3188	4.2269
85	1.1806	1.1314	1.0842	4.4340	4.3385	4.2457
86	1.1830	1.1334	1.0859	4.4546	4.3582	4.2646
87	1.1853	1.1355	1.0877	4.4752	4.3779	4.2835
88	1.1877	1.1375	1.0895	4.4958	4.3977	4.3024
89	1.1901	1.1396	1.0913	4.5165	4.4175	4.3214
90	1.1924	1.1417	1.0931	4.5373	4.4374	4.3404

$180° - \phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
45	-3.2615	-3.2079	-3.1555	.9714	.9483	.9257
46	-3.2836	-3.2294	-3.1763	.9941	.9702	.9469
47	-3.3052	-3.2501	-3.1963	1.0167	.9920	.9680
48	-3.3257	-3.2699	-3.2154	1.0391	1.0136	.9889
49	-3.3454	-3.2889	-3.2336	1.0613	1.0351	1.0096
50	-3.3643	-3.3072	-3.2514	1.0834	1.0564	1.0302
51	-3.3824	-3.3246	-3.2682	1.1054	1.0776	1.0506
52	-3.3997	-3.3414	-3.2844	1.1272	1.0987	1.0709
53	-3.4164	-3.3574	-3.2999	1.1489	1.1196	1.0911
54	-3.4323	-3.3728	-3.3147	1.1704	1.1404	1.1112
55	-3.4476	-3.3876	-3.3289	1.1919	1.1610	1.1311
56	-3.4623	-3.4017	-3.3425	1.2132	1.1816	1.1509
57	-3.4763	-3.4152	-3.3556	1.2344	1.2021	1.1706
58	-3.4898	-3.4282	-3.3681	1.2556	1.2224	1.1902
59	-3.5027	-3.4406	-3.3800	1.2766	1.2427	1.2097
60	-3.5150	-3.4525	-3.3914	1.2975	1.2628	1.2291
61	-3.5268	-3.4638	-3.4024	1.3184	1.2829	1.2485
62	-3.5381	-3.4747	-3.4128	1.3391	1.3029	1.2677
63	-3.5488	-3.4851	-3.4228	1.3598	1.3228	1.2869
64	-3.5591	-3.4949	-3.4323	1.3805	1.3426	1.3059
65	-3.5689	-3.5044	-3.4414	1.4010	1.3624	1.3250
66	-3.5783	-3.5134	-3.4500	1.4215	1.3821	1.3439
67	-3.5872	-3.5219	-3.4582	1.4420	1.4018	1.3628
68	-3.5956	-3.5300	-3.4661	1.4624	1.4214	1.3817
69	-3.6036	-3.5377	-3.4735	1.4827	1.4409	1.4005
70	-3.6112	-3.5450	-3.4805	1.5030	1.4605	1.4192
71	-3.6184	-3.5520	-3.4871	1.5233	1.4800	1.4380
72	-3.6252	-3.5585	-3.4934	1.5436	1.4994	1.4567
73	-3.6316	-3.5646	-3.4993	1.5638	1.5189	1.4753
74	-3.6376	-3.5703	-3.5048	1.5841	1.5383	1.4940
75	-3.6432	-3.5757	-3.5100	1.6043	1.5577	1.5126
76	-3.6484	-3.5807	-3.5148	1.6245	1.5771	1.5313
77	-3.6533	-3.5854	-3.5192	1.6447	1.5965	1.5499
78	-3.6577	-3.5897	-3.5234	1.6649	1.6159	1.5685
79	-3.6619	-3.5937	-3.5272	1.6852	1.6353	1.5871
80	-3.6656	-3.5973	-3.5306	1.7054	1.6548	1.6058
81	-3.6690	-3.6005	-3.5337	1.7257	1.6742	1.6244
82	-3.6720	-3.6034	-3.5365	1.7460	1.6937	1.6431
83	-3.6747	-3.6060	-3.5390	1.7664	1.7132	1.6618
84	-3.6770	-3.6082	-3.5411	1.7867	1.7327	1.6805
85	-3.6790	-3.6101	-3.5429	1.8072	1.7523	1.6993
86	-3.6806	-3.6116	-3.5444	1.8277	1.7719	1.7181
87	-3.6819	-3.6128	-3.5456	1.8482	1.7916	1.7369
88	-3.6828	-3.6137	-3.5464	1.8688	1.8114	1.7559
89	-3.6833	-3.6142	-3.5469	1.8895	1.8313	1.7748
90	-3.6835	-3.6144	-3.5471	1.9103	1.8511	1.7939

$\phi_c = 25°$

180°-φ	τ			σ		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
0	1.0000	1.0000	1.0000	.0000	.0000	.0000
1	.9993	.9984	.9975	.0885	.0884	.0884
2	.9988	.9971	.9953	.1767	.1765	.1764
3	.9987	.9961	.9934	.2644	.2640	.2637
4	.9989	.9954	.9919	.3513	.3507	.3501
5	.9994	.9950	.9907	.4374	.4364	.4355
6	1.0001	.9949	.9897	.5223	.5210	.5196
7	1.0011	.9951	.9891	.6060	.6042	.6024
8	1.0024	.9956	.9887	.6884	.6860	.6836
9	1.0040	.9963	.9887	7691	.7662	.7632
10	1.0058	.9973	.9889	.8483	.8447	.8411
11	1.0078	.9985	.9893	.9257	.9214	.9171
12	1.0100	.9999	.9900	1.0013	.9963	.9913
13	1.0124	1.0016	.9909	1.0750	1.0693	1.0636
14	1.0150	1.0034	.9920	1.1469	1.1404	1.1339
15	1.0177	1.0055	.9934	1.2169	1.2095	1.2022
16	1.0206	1.0077	.9949	1.2850	1.2768	1.2686
17	1.0237	1.0100	.9965	1.3511	1.3421	1.3331
18	1.0268	1.0125	.9984	1.4154	1.4055	1.3956
19	1.0301	1.0151	1.0003	1.4779	1.4670	1.4563
20	1.0335	1.0179	1.0024	1.5384	1.5267	1.5151
21	1.0370	1.0207	1.0047	1.5973	1.5846	1.5721
22	1.0405	1.0236	1.0070	1.6543	1.6408	1.6273
23	1.0441	1.0266	1.0094	1.7097	1.6952	1.6809
24	1.0478	1.0297	1.0119	1.7634	1.7480	1.7328
25	1.0516	1.0329	1.0146	1.8156	1.7993	1.7832
26	1.0554	1.0361	1.0172	1.8662	1.8490	1.8320
27	1.0592	1.0394	1.0200	1.9154	1.8972	1.8793
28	1.0631	1.0427	1.0228	1.9631	1.9441	1.9253
29	1.0670	1.0461	1.0256	2.0095	1.9895	1.9699
30	1.0709	1.0495	1.0285	2.0545	2.0337	2.0132
31	1.0748	1.0529	1.0315	2.0984	2.0766	2.0552
32	1.0788	1.0564	1.0345	2.1410	2.1184	2.0961
33	1.0828	1.0599	1.0375	2.1824	2.1590	2.1359
34	1.0867	1.0634	1.0405	2.2228	2.1985	2.1746
35	1.0907	1.0669	1.0436	2.2621	2.2370	2.2122
36	1.0947	1.0704	1.0467	2.3005	2.2745	2.2488
37	1.0987	1.0740	1.0498	2.3378	2.3110	2.2846
38	1.1028	1.0776	1.0529	2.3743	2.3466	2.3194
39	1.1068	1.0811	1.0561	2.4099	2.3814	2.3534
40	1.1108	1.0847	1.0592	2.4447	2.4154	2.3865
41	1.1146	1.0883	1.0624	2.4786	2.4485	2.4189
42	1.1188	1.0919	1.0656	2.5119	2.4810	2.4506
43	1.1228	1.0955	1.0688	2.5444	2.5127	2.4815
44	1.1268	1.0991	1.0720	2.5762	2.5437	2.5118

$180°-\phi°$	ℓ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
0	.0000	.0000	.0000	.0000	.0000	.0000
1	- .0885	- .0884	- .0884	.0008	.0008	.0008
2	- .1766	- .1765	- .1763	.0031	.0031	.0031
3	- .2642	- .2639	- .2635	.0069	.0069	.0069
4	- .3510	- .3504	- .3498	.0122	.0122	.0122
5	- .4368	- .4359	- .4349	.0190	.0189	.0189
6	- .5214	- .5200	- .5187	.0271	.0270	.0269
7	- .6046	- .6027	- .6009	.0366	.0364	.0363
8	- .6862	- .6838	- .6815	.0473	.0471	.0469
9	- .7660	- .7631	- .7602	.0593	.0590	.0586
10	- .8441	- .8405	- .8370	.0723	.0719	.0715
11	- .9202	- .9160	- .9118	.0864	.0859	.0854
12	- .9943	- .9894	- .9844	.1015	.1008	.1001
13	-1.0663	-1.0606	-1.0550	.1174	.1166	.1158
14	-1.1362	-1.1298	-1.1234	.1342	.1332	.1322
15	-1.2040	-1.1967	-1.1895	.1517	.1505	.1493
16	-1.2696	-1.2615	-1.2535	.1699	.1685	.1670
17	-1.3330	-1.3241	-1.3153	.1887	.1870	.1853
18	-1.3943	-1.3846	-1.3749	.2081	.2061	.2041
19	-1.4535	-1.4429	-1.4325	.2279	.2256	.2234
20	-1.5106	-1.4992	-1.4879	.2481	.2455	.2430
21	-1.5657	-1.5534	-1.5413	.2687	.2658	.2630
22	-1.6188	-1.6057	-1.5927	.2896	.2864	.2832
23	-1.6700	-1.6560	-1.6422	.3108	.3072	.3037
24	-1.7193	-1.7045	-1.6898	.3322	.3283	.3244
25	-1.7667	-1.7511	-1.7356	.3538	.3495	.3453
26	-1.8124	-1.7960	-1.7797	.3756	.3709	.3663
27	-1.8564	-1.8391	-1.8221	.3975	.3925	.3874
28	-1.8987	-1.8807	-1.8628	.4196	.4141	.4086
29	-1.9395	-1.9206	-1.9020	.4417	.4358	.4299
30	-1.9787	-1.9591	-1.9397	.4639	.4575	.4512
31	-2.0165	-1.9961	-1.9760	.4861	.4793	.4726
32	-2.0528	-2.0317	-2.0108	.5084	.5011	.4940
33	-2.0878	-2.0659	-2.0443	.5307	.5229	.5153
34	-2.1214	-2.0988	-2.0766	.5530	.5447	.5366
35	-2.1538	-2.1306	-2.1076	.5752	.5665	.5580
36	-2.1850	-2.1611	-2.1374	.5975	.5883	.5793
37	-2.2151	-2.1904	-2.1662	.6197	.6100	.6005
38	-2.2440	-2.2187	-2.1938	.6419	.6317	.6217
39	-2.2719	-2.2459	-2.2204	.6641	.6534	.6428
40	-2.2987	-2.2721	-2.2460	.6862	.6749	.6639
41	-2.3245	-2.2974	-2.2706	.7082	.6965	.6850
42	-2.3494	-2.3216	-2.2943	.7303	.7180	.7059
43	-2.3734	-2.3450	-2.3171	.7522	.7394	.7269
44	-2.3965	-2.3676	-2.3391	.7741	.7608	.7477

$180°-\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
45	1.1308	1.1026	1.0752	2.6074	2.5741	2.5415
46	1.1348	1.1062	1.0784	2.6379	2.6039	2.5705
47	1.1386	1.1098	1.0816	2.6679	2.6332	2.5990
48	1.1427	1.1134	1.0849	2.6974	2.6618	2.6270
49	1.1467	1.1170	1.0881	2.7262	2.6900	2.6544
50	1.1507	1.1206	1.0913	2.7546	2.7176	2.6813
51	1.1547	1.1242	1.0945	2.7826	2.7448	2.7078
52	1.1586	1.1278	1.0978	2.8100	2.7716	2.7338
53	1.1626	1.1314	1.1010	2.8370	2.7979	2.7594
54	1.1665	1.1350	1.1042	2.8637	2.8238	2.7846
55	1.1705	1.1385	1.1075	2.8899	2.8493	2.8094
56	1.1744	1.1421	1.1107	2.9158	2.8745	2.8339
57	1.1784	1.1457	1.1140	2.9413	2.8993	2.8581
58	1.1823	1.1493	1.1172	2.9665	2.9238	2.8819
59	1.1862	1.1529	1.1205	2.9914	2.9480	2.9054
60	1.1902	1.1565	1.1237	3.0161	2.9719	2.9287
61	1.1941	1.1600	1.1270	3.0404	2.9956	2.9517
62	1.1980	1.1636	1.1302	3.0645	3.0190	2.9744
63	1.2020	1.1672	1.1335	3.0884	3.0422	2.9969
64	1.2059	1.1708	1.1367	3.1120	3.0651	3.0192
65	1.2098	1.1744	1.1400	3.1354	3.0879	3.0413
66	1.2138	1.1780	1.1433	3.1587	3.1104	3.0632
67	1.2177	1.1816	1.1465	3.1818	3.1328	3.0849
68	1.2216	1.1852	1.1498	3.2047	3.1551	3.1065
69	1.2256	1.1888	1.1531	3.2274	3.1772	3.1279
70	1.2295	1.1924	1.1564	3.2501	3.1991	3.1492
71	1.2335	1.1960	1.1597	3.2726	3.2209	3.1704
72	1.2375	1.1997	1.1630	3.2950	3.2427	3.1915
73	1.2414	1.2033	1.1663	3.3174	3.2643	3.2124
74	1.2454	1.2069	1.1696	3.3396	3.2859	3.2333
75	1.2494	1.2106	1.1730	3.3618	3.3074	3.2542
76	1.2534	1.2143	1.1763	3.3839	3.3288	3.2750
77	1.2574	1.2179	1.1797	3.4060	3.3502	3.2957
78	1.2615	1.2216	1.1830	3.4281	3.3716	3.3164
79	1.2655	1.2253	1.1864	3.4502	3.3930	3.3371
80	1.2696	1.2290	1.1898	3.4722	3.4144	3.3578
81	1.2736	1.2328	1.1932	3.4943	3.4357	3.3785
82	1.2777	1.2365	1.1966	3.5164	3.4571	3.3992
83	1.2818	1.2403	1.2000	3.5386	3.4785	3.4199
84	1.2859	1.2440	1.2035	3.5608	3.5000	3.4407
85	1.2901	1.2478	1.2069	3.5830	3.5216	3.4615
86	1.2943	1.2516	1.2104	3.6054	3.5432	3.4824
87	1.2984	1.2555	1.2139	3.6276	3.5649	3.5034
88	1.3027	1.2593	1.2174	3.6504	3.5867	3.5245
89	1.3069	1.2632	1.2210	3.6730	3.6086	3.5457
90	1.3112	1.2671	1.2245	3.6958	3.6306	3.5670

$180° - \phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
45	-2.4187	-2.3892	-2.3603	.7960	.7821	.7685
46	-2.4401	-2.4101	-2.3806	.8178	.8034	.7892
47	-2.4606	-2.4302	-2.4002	.8395	.8246	.8099
48	-2.4807	-2.4496	-2.4191	.8612	.8457	.8305
49	-2.4998	-2.4683	-2.4373	.8829	.8668	.8510
50	-2.5182	-2.4862	-2.4548	.9044	.8878	.8715
51	-2.5360	-2.5035	-2.4716	.9260	.9088	.8919
52	-2.5531	-2.5202	-2.4878	.9475	.9297	.9123
53	-2.5696	-2.5362	-2.5034	.9689	.9506	.9326
54	-2.5854	-2.5516	-2.5184	.9903	.9714	.9529
55	-2.6006	-2.5664	-2.5328	1.0117	.9922	.9731
56	-2.6153	-2.5807	-2.5467	1.0330	1.0129	.9932
57	-2.6294	-2.5944	-2.5600	1.0543	1.0336	1.0134
58	-2.6429	-2.6075	-2.5728	1.0756	1.0543	1.0335
59	-2.6559	-2.6202	-2.5851	1.0968	1.0749	1.0535
60	-2.6684	-2.6323	-2.5969	1.1180	1.0955	1.0736
61	-2.6804	-2.6440	-2.6082	1.1392	1.1161	1.0936
62	-2.6919	-2.6551	-2.6191	1.1604	1.1367	1.1135
63	-2.7029	-2.6658	-2.6295	1.1815	1.1573	1.1335
64	-2.7135	-2.6761	-2.6394	1.2027	1.1778	1.1535
65	-2.7236	-2.6859	-2.6489	1.2238	1.1983	1.1734
66	-2.7332	-2.6952	-2.6580	1.2450	1.2189	1.1933
67	-2.7424	-2.7042	-2.6667	1.2662	1.2394	1.2133
68	-2.7512	-2.7127	-2.6749	1.2873	1.2599	1.2332
69	-2.7595	-2.7208	-2.6828	1.3085	1.2805	1.2531
70	-2.7675	-2.7285	-2.6902	1.3297	1.3011	1.2731
71	-2.7750	-2.7358	-2.6973	1.3510	1.3216	1.2930
72	-2.7821	-2.7426	-2.7040	1.3722	1.3423	1.3130
73	-2.7888	-2.7492	-2.7103	1.3935	1.3629	1.3330
74	-2.7951	-2.7553	-2.7162	1.4148	1.3836	1.3531
75	-2.8014	-2.7610	-2.7218	1.4362	1.4043	1.3731
76	-2.8066	-2.7664	-2.7270	1.4577	1.4251	1.3933
77	-2.8118	-2.7714	-2.7318	1.4791	1.4459	1.4134
78	-2.8165	-2.7760	-2.7363	1.5007	1.4667	1.4336
79	-2.8209	-2.7803	-2.7404	1.5223	1.4877	1.4539
80	-2.8250	-2.7842	-2.7442	1.5440	1.5087	1.4742
81	-2.8286	-2.7877	-2.7476	1.5658	1.5298	1.4946
82	-2.8319	-2.7909	-2.7507	1.5876	1.5509	1.5151
83	-2.8348	-2.7937	-2.7534	1.6096	1.5722	1.5357
84	-2.8373	-2.7961	-2.7557	1.6317	1.5935	1.5563
85	-2.8394	-2.7982	-2.7577	1.6538	1.6149	1.5771
86	-2.8412	-2.7999	-2.7594	1.6761	1.6365	1.5979
87	-2.8425	-2.8012	-2.7607	1.6985	1.6581	1.6188
88	-2.8435	-2.8021	-2.7616	1.7210	1.6799	1.6399
89	-2.8441	-2.8027	-2.7621	1.7437	1.7018	1.6611
90	-2.8443	-2.8029	-2.7623	1.7665	1.7239	1.6824

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180° - ϕ	τ			σ		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0 02	f = 0.03
0	1.0000	1.0000	1.0000	.0000	.0000	.0000
1	.9995	.9989	.9983	.0604	.0604	.0604
2	.9994	.9982	.9970	.1207	.1207	.1206
3	.9996	.9977	.9959	.1808	1806	.1805
4	1.0000	.9976	.9952	.2406	.2403	.2400
5	1.0008	.9978	.9948	.3000	.2995	.2991
6	1.0018	.9982	.9946	.3589	.3583	.3576
7	1.0031	.9990	.9948	.4173	.4164	.4156
8	1.0047	1.0000	.9952	.4751	.4740	.4728
9	1.0066	1.0013	.9959	.5323	.5308	.5294
10	1.0087	1.0028	.9969	.5886	.5868	.5851
11	1.0111	1.0046	.9982	.6441	.6421	.6400
12	1.0137	1.0066	.9997	.6989	.6965	.6941
13	1.0165	1.0089	1.0014	.7528	.7500	.7472
14	1.0196	1.0114	1.0033	.8058	.8026	.7994
15	1.0228	1.0141	1.0055	.8579	.8542	.8506
16	1.0262	1.0170	1.0079	.9090	.9049	.9009
17	1.0298	1.0201	1.0104	.9592	.9547	.9501
18	1.0336	1.0233	1.0132	1.0085	1.0034	.9984
19	1.0376	1.0268	1.0161	1.0567	1.0512	1.0457
20	1.0416	1.0303	1.0192	1.1041	1.0980	1.0920
21	1.0459	1.0341	1.0224	1.1504	1.1439	1.1373
22	1.0502	1.0379	1.0257	1.1958	1.1887	1.1817
23	1.0547	1.0419	1.0292	1.2403	1.2327	1.2251
24	1.0593	1.0460	1.0329	1.2838	1.2757	1.2676
25	1.0639	1.0502	1.0366	1.3264	1.3177	1.3091
26	1.0687	1.0545	1.0404	1.3682	1.3589	1.3498
27	1.0736	1.0589	1.0443	1.4090	1.3992	1.3895
28	1.0785	1.0633	1.0484	1.4491	1.4387	1.4285
29	1.0835	1.0679	1.0525	1.4883	1.4773	1.4665
30	1.0886	1.0725	1.0566	1.5266	1.5152	1.5038
31	1.0937	1.0772	1.0609	1.5643	1.5522	1.5403
32	1.0989	1.0819	1.0652	1.6011	1.5885	1.5761
33	1.1041	1.0867	1.0696	1.6372	1.6241	1.6111
34	1.1094	1.0916	1.0740	1.6727	1.6589	1.6454
35	1.1148	1.0965	1.0785	1.7074	1.6931	1.6790
36	1.1201	1.1014	1.0831	1.7415	1.7266	1.7120
37	1.1255	1.1064	1.0876	1.7749	1.7595	1.7443
38	1.1310	1.1115	1.0923	1.8078	1.7918	1.7760
39	1.1365	1.1165	1.0969	1.8400	1.8235	1.8072
40	1.1420	1.1216	1.1016	1.8717	1.8546	1.8377
41	1.1475	1.1267	1.1064	1.9029	1.8852	1.8678
42	1.1531	1.1319	1.1111	1.9335	1.9153	1.8973
43	1.1586	1.1371	1.1159	1.9637	1.9449	1.9264
44	1.1642	1.1423	1.1207	1.9933	1.9740	1.9549

$180°-\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
0	.0000	.0000	.0000	.0000	.0000	.0000
1	− .0604	− .0604	− .0604	.0005	.0005	.0005
2	− .1207	− .1206	− .1206	.0021	.0021	.0021
3	− .1807	− .1806	− .1804	.0047	.0047	.0047
4	− .2404	− .2401	− .2398	.0084	.0084	.0083
5	− .2996	− .2992	− .2987	.0130	.0130	.0130
6	− .3583	− .3576	− .3570	.0187	.0186	.0186
7	− .4163	− .4154	− .4145	.0253	.0252	.0252
8	− .4736	− .4724	− .4713	.0328	.0327	.0326
9	− .5300	− .5286	− .5272	.0413	.0411	.0410
10	− .5856	− .5839	− .5822	.0506	.0504	.0502
11	− .6403	− .6382	− .6362	.0607	.0604	.0602
12	− .6940	− .6915	− .6891	.0716	.0713	.0710
13	− .7466	− .7438	− .7410	.0833	.0829	.0825
14	− .7981	− .7949	− .7918	.0957	.0951	.0946
15	− .8485	− .8449	− .8414	.1087	.1081	.1075
16	− .8978	− .8938	− .8898	.1224	.1216	.1209
17	− .9460	− .9415	− .9370	.1366	.1358	.1349
18	− .9929	− .9880	− .9831	.1514	.1504	.1494
19	−1.0387	−1.0333	−1.0279	.1667	.1656	.1644
20	−1.0833	−1.0774	−1.0716	.1825	.1812	.1799
21	−1.1267	−1.1203	−1.1140	.1988	.1972	.1957
22	−1.1689	−1.1621	−1.1553	.2154	.2137	.2120
23	−1.2100	−1.2027	−1.1954	.2324	.2305	.2286
24	−1.2499	−1.2421	−1.2344	.2498	.2476	.2455
25	−1.2887	−1.2804	−1.2722	.2674	.2651	.2628
26	−1.3264	−1.3176	−1.3089	.2854	.2828	.2803
27	−1.3630	−1.3537	−1.3445	.3036	.3008	.2980
28	−1.3985	−1.3887	−1.3790	.3221	.3190	.3160
29	−1.4329	−1.4226	−1.4124	.3408	.3375	.3341
30	−1.4653	−1.4556	−1.4449	.3597	.3561	.3525
31	−1.4987	−1.4875	−1.4763	.3788	.3749	.3710
32	−1.5302	−1.5134	−1.5068	.3981	.3939	.3897
33	−1.5606	−1.5484	−1.5363	.4175	.4130	.4085
34	−1.5902	−1.5775	−1.5649	.4370	.4322	.4274
35	−1.6188	−1.6057	−1.5927	.4567	.4515	.4465
36	−1.6466	−1.6330	−1.6195	.4765	.4710	.4656
37	−1.6734	−1.6594	−1.6455	.4964	.4906	.4848
38	−1.6995	−1.6850	−1.6707	.5164	.5102	.5042
39	−1.7247	−1.7098	−1.6950	.5365	.5300	.5235
40	−1.7492	−1.7338	−1.7186	.5566	.5498	.5430
41	−1.7729	−1.7571	−1.7415	.5769	.5697	.5625
42	−1.7958	−1.7796	−1.7636	.5972	.5896	.5821
43	−1.8181	−1.8014	−1.7850	.6175	.6096	.6017
44	−1.8396	−1.8226	−1.8057	.6379	.6296	.6214

$$\phi_c = 30° \text{ (continued)}$$

180°-φ°	τ			σ		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
45	1.1698	1.1475	1.1256	2.0226	2.0027	1.9831
46	1.1755	1.1527	1.1304	2.0513	2.0309	2.0107
47	1.1811	1.1580	1.1353	2.0797	2.0587	2.0380
48	1.1868	1.1633	1.1402	2.1077	2.0862	2.0649
49	1.1925	1.1686	1.1452	2.1353	2.1132	2.0914
50	1.1982	1.1739	1.1501	2.1625	2.1399	2.1176
51	1.2039	1.1793	1.1551	2.1895	2.1663	2.1434
52	1.2097	1.1846	1.1601	2.2160	2.1923	2.1689
53	1.2154	1.1900	1.1651	2.2423	2.2180	2.1941
54	1.2212	1.1954	1.1702	2.2683	2.2435	2.2190
55	1.2270	1.2008	1.1752	2.2941	2.2687	2.2437
56	1.2328	1.2063	1.1803	2.3195	2.2936	2.2681
57	1.2386	1.2117	1.1854	2.3448	2.3183	2.2922
58	1.2445	1.2172	1.1905	2.3698	2.3428	2.3162
59	1.2503	1.2227	1.1956	2.3946	2.3670	2.3399
60	1.2562	1.2282	1.2008	2.4192	2.3911	2.3634
61	1.2621	1.2337	1.2059	2.4436	2.4150	2.3868
62	1.2680	1.2392	1.2111	2.4679	2.4387	2.4099
63	1.2739	1.2448	1.2163	2.4920	2.4622	2.4330
64	1.2799	1.2504	1.2215	2.5160	2.4857	2.4558
65	1.2859	1.2560	1.2268	2.5398	2.5089	2.4786
66	1.2919	1.2616	1.2321	2.5635	2.5321	2.5012
67	1.2979	1.2673	1.2373	2.5872	2.5552	2.5238
68	1.3039	1.2729	1.2427	2.6107	2.5782	2.5462
69	1.3100	1.2786	1.2480	2.6342	2.6011	2.5686
70	1.3161	1.2843	1.2534	2.6576	2.6240	2.5909
71	1.3222	1.2901	1.2588	2.6810	2.6468	2.6132
72	1.3284	1.2959	1.2642	2.7044	2.6696	2.6354
73	1.3346	1.3017	1.2696	2.7277	2.6923	2.6576
74	1.3408	1.3075	1.2751	2.7510	2.7151	2.6797
75	1.3470	1.3134	1.2806	2.7743	2.7378	2.7019
76	1.3533	1.3193	1.2861	2.7977	2.7606	2.7241
77	1.3597	1.3252	1.2917	2.8210	2.7834	2.7463
78	1.3660	1.3312	1.2973	2.8444	2.8062	2.7686
79	1.3724	1.3372	1.3029	2.8679	2.8291	2.7909
80	1.3789	1.3433	1.3086	2.8915	2.8520	2.8132
81	1.3854	1.3494	1.3143	2.9151	2.8750	2.8357
82	1.3919	1.3555	1.3201	2.9389	2.8982	2.8582
83	1.3985	1.3617	1.3259	2.9627	2.9214	2.8808
84	1.4052	1.3679	1.3317	2.9867	2.9447	2.9035
85	1.4118	1.3742	1.3376	3.0108	2.9682	2.9264
86	1.4186	1.3806	1.3435	3.0352	2.9919	2.9494
87	1.4254	1.3869	1.3495	3.0596	3.0157	2.9726
88	1.4323	1.3934	1.3556	3.0843	3.0397	2.9960
89	1.4392	1.3999	1.3616	3.1092	3.0639	3.0195
90	1.4462	1.4064	1.3678	3.1343	3.0884	3.0433

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$180° - \phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
45	-1.6604	-1.6430	-1.6258	.6584	6497	.6411
46	-1.6806	-1.6628	-1.6452	.6790	.6698	.6608
47	-1.9001	-1.8819	-1.8640	.6995	.6900	.6806
48	-1.9190	-1.9005	-1.8821	.7202	.7102	.7004
49	-1.9373	-1.9184	-1.8997	.7409	7305	.7203
50	-1.9550	-1.9357	-1.9167	7616	7508	.7402
51	-1.9721	-1.9525	-1.9331	.7823	.7711	.7601
52	-1.9887	-1.9687	-1.9490	.8031	.7915	.7801
53	-2.0047	-1.9844	-1.9643	.8240	.8119	.8001
54	-2.0202	-1.9995	-1.9792	.8449	.8324	.8201
55	-2.0351	-2.0141	-1.9935	.8658	.8529	.8401
56	-2.0495	-2.0283	-2.0073	.8868	.8734	.8603
57	-2.0635	-2.0419	-2.0206	.9079	.8940	.8804
58	-2.0769	-2.0550	-2.0335	.9290	.9147	.9006
59	-2.0899	-2.0677	-2.0459	.9501	.9353	.9208
60	-2.1023	-2.0799	-2.0578	.9713	.9561	.9411
61	-2.1144	-2.0917	-2.0693	.9926	.9769	.9614
62	-2.1259	-2.1030	-2.0804	1.0139	.9977	9818
63	-2.1371	-2.1139	-2.0910	1.0353	1.0185	1.0022
64	-2.1478	-2.1243	-2.1012	1.0567	1.0395	1.0227
65	-2.1580	-2.1344	-2.1110	1.0783	1.0606	1.0432
66	-2.1679	-2.1440	-2.1204	1.0999	1.0817	1.0638
67	-2.1773	-2.1532	-2.1294	1.1215	1.1028	1.0845
68	-2.1863	-2.1620	-2.1380	1.1433	1.1241	1.1052
69	-2.1949	-2.1704	-2.1462	1.1651	1.1454	1.1260
70	-2.2031	-2.1784	-2.1540	1.1871	1.1668	1.1469
71	-2.2109	-2.1860	-2.1614	1.2091	1.1883	1.1679
72	-2.2183	-2.1932	-2.1685	1.2312	1.2099	1.1890
73	-2.2253	-2.2001	-2.1751	1.2535	1.2316	1.2101
74	-2.2320	-2.2065	-2.1814	1.2758	1.2534	1.2314
75	-2.2382	-2.2126	-2.1874	1.2983	1.2753	1.2528
76	-2.2441	-2.2183	-2.1929	1.3209	1.2974	1.2743
77	-2.2495	-2.2236	-2.1981	1.3436	1.3195	1.2958
78	-2.2546	-2.2285	-2.2029	1.3665	1.3418	1.3176
79	-2.2592	-2.2331	-2.2074	1.3895	1.3642	1.3394
80	-2.2636	-2.2373	-2.2114	1.4127	1.3868	1.3614
81	-2.2674	-2.2411	-2.2151	1.4360	1.4095	1.3835
82	-2.2710	-2.2445	-2.2185	1.4595	1.4324	1.4058
83	-2.2741	-2.2475	-2.2214	1.4831	1.4554	1.4282
84	-2.2766	-2.2502	-2.2240	1.5070	1.4786	1.4508
85	-2.2791	-2.2524	-2.2262	1.5310	1.5020	1.4736
86	-2.2810	-2.2543	-2.2280	1.5552	1.5256	1.4965
87	-2.2825	-2.2557	-2.2294	1.5797	1.5493	1.5197
88	-2.2836	-2.2568	-2.2304	1.6043	1.5733	1.5430
89	-2.2842	-2.2574	-2.2310	1.6292	1.5975	1.5665
90	-2.2845	-2.2576	-2.2313	1.6543	1.6220	1.5903

$\phi_c = 35°$

$180°-\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
0	1.0000	1.0000	1.0000	.0000	.0000	.0000
1	.9997	.9993	.9988	.0434	.0434	.0434
2	.9997	.9989	.9980	.0868	.0868	.0867
3	1.0001	.9968	.9975	.1301	.1300	.1299
4	1.0007	.9990	.9972	.1733	.1731	.1730
5	1.0016	.9995	.9973	.2162	.2160	.2158
6	1.0028	1.0002	.9977	.2590	.2587	.2583
7	1.0043	1.0013	.9983	.3015	.3011	.3006
8	1.0061	1.0027	.9993	.3438	.3432	.3426
9	1.0082	1.0043	1.0005	.3857	.3850	.3842
10	1.0105	1.0062	1.0020	.4273	.4264	.4255
11	1.0132	1.0084	1.0037	.4686	.4675	.4664
12	1.0160	1.0109	1.0058	.5095	.5082	.5069
13	1.0191	1.0136	1.0080	.5499	.5484	.5469
14	1.0225	1.0165	1.0106	.5899	.5882	.5865
15	1.0261	1.0197	1.0133	.6295	.6276	.6256
16	1.0299	1.0231	1.0163	.6687	.6664	.6642
17	1.0339	1.0267	1.0195	.7073	.7049	.7024
18	1.0381	1.0305	1.0229	.7455	.7428	.7400
19	1.0436	1.0345	1.0266	.7832	.7802	.7772
20	1.0472	1.0387	1.0304	.8204	.8171	.8138
21	1.0530	1.0431	1.0344	.8572	.8535	.8499
22	1.0569	1.0477	1.0385	.8934	.8895	.8855
23	1.0621	1.0524	1.0429	.9291	.9249	.9206
24	1.0674	1.0573	1.0474	.9644	.9598	.9552
25	1.0728	1.0624	1.0520	.9991	.9942	.9893
26	1.0784	1.0676	1.0568	1.0334	1.0281	1.0229
27	1.0841	1.0729	1.0618	1.0672	1.0616	1.0560
28	1.0899	1.0783	1.0668	1.1005	1.0945	1.0886
29	1.0959	1.0839	1.0720	1.1333	1.1270	1.1208
30	1.1020	1.0896	1.0774	1.1657	1.1591	1.1524
31	1.1082	1.0954	1.0828	1.1977	1.1907	1.1837
32	1.1145	1.1013	1.0883	1.2292	1.2218	1.2145
33	1.1209	1.1073	1.0940	1.2603	1.2525	1.2448
34	1.1274	1.1134	1.0997	1.2910	1.2828	1.2747
35	1.1340	1.1197	1.1055	1.3213	1.3127	1.3043
36	1.1406	1.1259	1.1114	1.3511	1.3422	1.3334
37	1.1474	1.1323	1.1174	1.3806	1.3714	1.3621
38	1.1542	1.1388	1.1235	1.4098	1.4001	1.3905
39	1.1611	1.1453	1.1297	1.4386	1.4285	1.4185
40	1.1681	1.1519	1.1359	1.4670	1.4566	1.4462
41	1.1752	1.1586	1.1422	1.4952	1.4843	1.4735
42	1.1823	1.1653	1.1486	1.5230	1.5117	1.5006
43	1.1895	1.1721	1.1551	1.5505	1.5388	1.5273
44	1.1967	1.1790	1.1616	1.5777	1.5656	1.5537

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180°-φ	ξ			η		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
0	.0000	.0000	.0000	.0000	.0000	.0000
1	- .0434	- .0434	- .0434	.0004	.0004	.0004
2	- .0868	- .0868	- .0867	.0015	.0015	.0015
3	- .1301	- .1300	- .1299	.0034	.0034	.0034
4	- .1731	- .1730	- .1728	.0060	.0060	.0060
5	- .2160	- .2157	- .2155	.0094	.0094	.0094
6	- .2585	- .2582	- .2579	.0135	.0135	.0135
7	- .3008	- .3003	- .2999	.0183	.0183	.0182
8	- .3427	- .3421	- .3415	.0238	.0238	.0237
9	- .3842	- .3834	- .3827	.0300	.0300	.0299
10	- .4252	- .4243	- .4234	.0369	.0368	.0367
11	- .4658	- .4647	- .4636	.0444	.0443	.0441
12	- .5058	- .5045	- .5032	.0526	.0524	.0522
13	- .5453	- .5438	- .5423	.0613	.0611	.0609
14	- .5842	- .5825	- .5808	.0707	.0704	.0701
15	- .6236	- .6206	- .6187	.0806	.0802	.0799
16	- .6603	- .6581	- .6559	.0910	.0906	.0902
17	- .6973	- .6949	- .6925	.1020	.1015	.1011
18	- .7338	- .7311	- .7284	.1135	.1129	.1124
19	- .7695	- .7666	- .7636	.1255	.1248	.1242
20	- .8046	- .8014	- .7981	.1379	.1371	.1364
21	- .8390	- .8355	- .8320	.1507	.1499	.1490
22	- .8727	- .8689	- .8651	.1640	1630	.1621
23	- .9057	- .9016	- .8975	.1777	.1766	.1755
24	- .9380	- .9336	- .9293	.1917	.1905	.1893
25	- .9697	- .9650	- .9603	.2062	.2048	.2034
26	-1.0006	- .9956	- .9906	.2209	.2194	.2179
27	-1.0308	-1.0255	-1.0202	.2360	.2343	.2327
28	-1.0604	-1.0548	-1.0492	.2514	.2495	.2477
29	-1.0892	-1.0833	-1.0774	.2670	.2651	.2631
30	-1.1174	-1.1112	-1.1050	.2830	.2808	.2787
31	-1.1450	-1.1384	-1.1319	.2992	.2969	.2945
32	-1.1719	-1.1650	-1.1581	.3157	.3131	.3106
33	-1.1981	-1.1909	-1.1837	.3324	.3296	.3269
34	-1.2237	-1.2162	-1.2087	.3493	.3464	.3434
35	-1.2486	-1.2408	-1.2330	.3665	.3633	.3602
36	-1.2729	-1.2648	-1.2567	.3838	.3804	.3771
37	-1.2967	-1.2882	-1.2798	.4014	.3978	.3942
38	-1.3198	-1.3110	-1.3024	.4191	.4153	.4114
39	-1.3423	-1.3333	-1.3243	.4370	.4329	.4289
40	-1.3643	-1.3549	-1.3456	.4551	.4508	.4465
41	-1.3856	-1.3760	-1.3664	.4734	.4688	.4642
42	-1.4065	-1.3965	-1.3867	.4918	.4869	.4821
43	-1.4267	-1.4165	-1.4064	.5104	.5053	.5002
44	-1.4465	-1.4360	-1.4255	.5291	.5237	.5184

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180°-ϕ°	τ			σ		
	f = 0.01	f = 0 02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
45	1.2040	1.1860	1.1682	1.6046	1.5922	1.5798
46	1.2114	1.1930	1.1748	1.6313	1.6184	1.6057
47	1.2189	1.2000	1.1815	1.6577	1.6445	1.6313
48	1.2263	1.2071	1.1882	1.6839	1.6702	1.6567
49	1.2339	1.2143	1.1950	1.7099	1.6958	1.6819
50	1.2415	1.2215	1.2019	1.7356	1.7211	1.7068
51	1.2492	1.2288	1.2088	1.7612	1.7463	1.7315
52	1.2569	1.2362	1.2158	1.7865	1.7712	1.7561
53	1.2646	1.2436	1.2228	1.8117	1.7960	1.7804
54	1.2725	1.2510	1.2299	1.8367	1.8206	1.8046
55	1.2804	1.2585	1.2371	1.8616	1.8450	1.8286
56	1.2883	1.2661	1.2442	1.8863	1.8693	1.8525
57	1.2963	1.2737	1.2515	1.9109	1.8935	1.8762
58	1.3043	1.2814	1.2588	1.9354	1.9175	1.8999
59	1.3124	1.2891	1.2661	1.9597	1.9415	1.9234
60	1.3206	1.2968	1.2735	1.9840	1.9653	1.9468
61	1.3286	1.3047	1.2810	2.0082	1.9891	1.9702
62	1.3371	1.3126	1.2885	2.0324	2.0128	1.9934
63	1.3454	1.3205	1.2961	2.0564	2.0364	2.0166
64	1.3538	1.3285	1.3037	2.0805	2.0600	2.0398
65	1.3623	1.3366	1.3114	2.1045	2.0835	2.0629
66	1.3708	1.3447	1.3191	2.1285	2.1071	2.0860
67	1.3794	1.3529	1.3269	2.1524	2.1306	2.1090
68	1.3880	1.3612	1.3348	2.1764	2.1541	2.1321
69	1.3966	1.3695	1.3427	2.2004	2.1776	2.1552
70	1.4056	1.3779	1.3507	2.2244	2.2012	2.1782
71	1.4144	1.3863	1.3588	2.2485	2.2248	2.2014
72	1.4234	1.3949	1.3669	2.2726	2.2484	2.2245
73	1.4324	1.4035	1.3751	2.2968	2.2721	2.2478
74	1.4415	1.4121	1.3834	2.3211	2.2959	2.2711
75	1.4507	1.4209	1.3917	2.3454	2.3197	2.2944
76	1.4600	1.4297	1.4001	2.3699	2.3437	2.3179
77	1.4693	1.4387	1.4086	2.3945	2.3678	2.3415
78	1.4788	1.4477	1.4172	2.4192	2.3920	2.3652
79	1.4883	1.4568	1.4259	2.4441	2.4164	2.3890
80	1.4980	1.4660	1.4347	2.4692	2.4409	2.4131
81	1.5077	1.4753	1.4435	2.4944	2.4656	2.4372
82	1.5176	1.4847	1.4524	2.5199	2.4905	2.4616
83	1.5275	1.4941	1.4615	2.5455	2.5156	2.4861
84	1.5376	1.5038	1.4706	2.5714	2.5410	2.5109
85	1.5478	1.5135	1.4799	2.5976	2.5665	2.5359
86	1.5581	1.5233	1.4892	2.6240	2.5924	2.5612
87	1.5686	1.5332	1.4987	2.6508	2.6185	2.5868
88	1.5792	1.5433	1.5083	2.6778	2.6449	2.6126
89	1.5899	1.5535	1.5180	2.7052	2.6717	2.6387
90	1.6007	1.5639	1.5279	2.7330	2.6988	2.6652

$180°-\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
45	-1.4657	-1.4549	-1.4442	.5480	.5423	.5367
46	-1.4844	-1.4733	-1.4623	.5670	.5611	.5552
47	-1.5026	-1.4912	-1.4799	.5862	.5799	.5737
48	-1.5203	-1.5086	-1.4971	.6055	.5989	.5925
49	-1.5375	-1.5256	-1.5137	.6249	.6181	.6113
50	-1.5542	-1.5420	-1.5299	.6445	.6373	.6302
51	-1.5704	-1.5580	-1.5457	.6642	.6567	.6493
52	-1.5862	-1.5735	-1.5609	.6841	.6762	.6685
53	-1.6016	-1.5886	-1.5758	.7040	.6959	.6878
54	-1.6164	-1.6032	-1.5901	.7242	.7157	.7073
55	-1.6309	-1.6174	-1.6041	.7444	.7356	.7268
56	-1.6449	-1.6312	-1.6176	.7648	.7556	.7465
57	-1.6585	-1.6445	-1.6307	.7853	.7757	.7663
58	-1.6716	-1.6575	-1.6434	.8059	.7960	.7863
59	-1.6843	-1.6700	-1.6557	.8267	.8164	.8063
60	-1.6967	-1.6821	-1.6676	.8476	.8370	.8265
61	-1.7086	-2.6938	-1.6791	.8687	.8577	.8468
62	-1.7201	-1.7051	-1.6902	.8899	.8785	.8672
63	-1.7312	-1.7160	-1.7009	.9113	.8995	.8878
64	-1.7419	-1.7265	-1.7112	.9328	.9206	.9085
65	-1.7523	-1.7367	-1.7212	.9544	.9418	.9294
66	-1.7622	-1.7464	-1.7308	.9763	.9632	.9504
67	-1.7718	-1.7558	-1.7400	.9982	.9848	.9715
68	-1.7809	-1.7648	-1.7488	1.0204	1.0065	.9929
69	-1.7897	-1.7734	-1.7572	1.0427	1.0284	1.0143
70	-1.7982	-1.7817	-1.7653	1.0652	1.0505	1.0359
71	-1.8062	-1.7895	-1.7730	1.0879	1.0727	1.0577
72	-1.8138	-1.7970	-1.7804	1.1108	1.0951	1.0797
73	-1.8211	-1.8042	-1.7874	1.1338	1.1177	1.1019
74	-1.8280	-1.8109	-1.7940	1.1571	1.1405	1.1242
75	-1.8345	-1.8173	-1.8002	1.1806	1.1635	1.1467
76	-1.8406	-1.8233	-1.8061	1.2043	1.1867	1.1695
77	-1.8464	-1.8289	-1.8116	1.2282	1.2102	1.1924
78	-1.8517	-1.8342	-1.8168	1.2524	1.2338	1.2155
79	-1.8567	-1.8390	-1.8215	1.2767	1.2577	1.2389
80	-1.8613	-1.8435	-1.8259	1.3014	1.2818	1.2625
81	-1.8654	-1.8476	-1.8299	1.3263	1.3061	1.2863
82	-1.8692	-1.8512	-1.8335	1.3515	1.3308	1.3104
83	-1.8725	-1.8545	-1.8367	1.3769	1.3557	1.3348
84	-1.8755	-1.8574	-1.8395	1.4026	1.3808	1.3594
85	-1.8780	-1.8598	-1.8419	1.4287	1.4063	1.3843
86	-1.8801	-1.8619	-1.8439	1.4550	1.4321	1.4095
87	-1.8817	-1.8635	-1.8454	1.4817	1.4581	1.4350
88	-1.8829	-1.8646	-1.8465	1.5087	1.4846	1.4608
89	-1.8836	-1.8653	-1.8472	1.5361	1.5113	1.4870
90	-1.8838	-1.8655	-1.8475	1.5639	1.5384	1.5134

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$$\phi_c = 40°$$

$180°-\phi$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
0	1.0000	1.0000	1.0000	.0000	.0000	.0000
1	.9998	.9995	.9992	.0324	.0323	.0323
2	1.0000	.9993	.9987	.0647	.0647	.0646
3	1.0004	.9994	.9985	.0970	.0969	.0969
4	1.0011	.9998	.9986	.1293	.1291	.1290
5	1.0022	1.0006	.9989	.1613	.1612	.1611
6	1.0035	1.0016	.9996	.1934	.1932	.1930
7	1.0051	1.0029	1.0006	.2253	.2251	.2248
8	1.0071	1.0045	1.0019	.2571	.2568	.2565
9	1.0093	1.0064	1.0035	.2888	.2884	.2880
10	1.0113	1.0085	1.0053	.3204	.3198	.3193
11	1.0145	1.0110	1.0075	.3517	.3511	.3505
12	1.0176	1.0137	1.0099	.3829	.3822	.3815
13	1.0209	1.0167	1.0125	.4140	.4131	.4123
14	1.0245	1.0200	1.0155	.4448	.4438	.4428
15	1.0283	1.0235	1.0186	.4754	.4743	.4732
16	1.0324	1.0272	1.0221	.5058	.5046	.5033
17	1.0367	1.0312	1.0258	.5360	.5346	.5332
18	1.0413	1.0355	1.0297	.5660	.5644	.5628
19	1.0461	1.0399	1.0338	.5958	.5940	.5923
20	1.0511	1.0446	1.0382	.6253	.6234	.6214
21	1.0563	1.0495	1.0428	.6546	.6525	.6503
22	1.0618	1.0547	1.0476	.6836	.6813	.6790
23	1.0674	1.0600	1.0526	.7125	.7099	.7074
24	1.0733	1.0655	1.0578	.7410	.7383	.7356
25	1.0795	1.0713	1.0633	.7694	.7665	.7636
26	1.0856	1.0772	1.0688	.7975	.7944	.7912
27	1.0920	1.0833	1.0746	.8254	.8220	.8187
28	1.0986	1.0896	1.0806	.8530	.8494	.8459
29	1.1054	1.0960	1.0867	.8804	.8766	.8728
30	1.1124	1.1026	1.0930	.9076	.9036	.8995
31	1.1195	1.1094	1.0995	.9346	.9303	.9260
32	1.1267	1.1164	1.1061	.9613	.9568	.9523
33	1.1342	1.1234	1.1128	.9878	.9831	.9783
34	1.1417	1.1307	1.1198	1.0142	1.0091	1.0041
35	1.1494	1.1381	1.1268	1.0403	1.0350	1.0298
36	1.1573	1.1456	1.1340	1.0662	1.0607	1.0552
37	1.1653	1.1533	1.1413	1.0920	1.0862	1.0804
38	1.1734	1.1611	1.1488	1.1175	1.1115	1.1054
39	1.1817	1.1690	1.1564	1.1429	1.1366	1.1303
40	1.1901	1.1771	1.1641	1.1681	1.1615	1.1549
41	1.1986	1.1852	1.1720	1.1932	1.1865	1.1794
42	1.2073	1.1935	1.1800	1.2181	1.2109	1.2038
43	1.2161	1.2020	1.1880	1.2428	1.2354	1.2280
44	1.2250	1.2105	1.1962	1.2675	1.2597	1.2520

$180°-\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
0	.0000	.0000	.0000	.0000	.0000	.0000
1	- .0323	- .0323	- .0323	.0003	.0003	.0003
2	- .0647	- .0646	- .0646	.0011	.0011	.0011
3	- .0969	- .0969	- .0968	.0025	.0025	.0025
4	- .1291	- .1290	- .1289	.0045	.0045	.0045
5	- .1611	- .1610	- .1609	.0070	.0070	.0070
6	- .1930	- .1928	- .1926	.0101	.0101	.0101
7	- .2248	- .2245	- .2242	.0137	.0137	.0137
8	- .2563	- .2560	- .2556	.0179	.0178	.0178
9	- .2876	- .2872	- .2868	.0225	.0225	.0225
10	- .3187	- .3182	- .3177	.0278	.0277	.0276
11	- .3496	- .3490	- .3484	.0335	.0334	.0333
12	- .3802	- .3795	- .3787	.0397	.0396	.0395
13	- .4105	- .4096	- .4088	.0464	.0463	.0462
14	- .4404	- .4395	- .4385	.0536	.0534	.0533
15	- .4701	- .4690	- .4679	.0613	.0611	.0609
16	- .4994	- .4982	- .4969	.0694	.0692	.0689
17	- .5284	- .5270	- .5256	.0780	.0777	.0774
18	- .5569	- .5554	- .5538	.0870	.0867	.0863
19	- .5852	- .5835	- .5817	.0964	.0960	.0957
20	- .6130	- .6111	- .6092	.1063	.1058	.1054
21	- .6404	- .6384	- .6363	.1165	.1160	.1155
22	- .6675	- .6652	- .6630	.1272	.1266	.1260
23	- .6941	- .6917	- .6893	.1382	.1376	.1369
24	- .7203	- .7177	- .7151	.1496	.1489	.1482
25	- .7461	- .7433	- .7405	.1614	.1605	.1597
26	- .7715	- .7685	- .7655	.1735	.1726	.1717
27	- .7964	- .7932	- .7901	.1859	.1849	.1839
28	- .8209	- .8175	- .8142	.1987	.1976	.1965
29	- .8450	- .8414	- .8379	.2117	.2105	.2093
30	- .8687	- .8649	- .8611	.2251	.2238	.2225
31	- .8919	- .8879	- .8839	.2388	.2374	.2359
32	- .9147	- .9105	- .9063	.2528	.2513	.2496
33	- .9371	- .9327	- .9283	.2670	.2653	.2636
34	- .9590	- .9544	- .9498	.2816	.2797	.2779
35	- .9806	- .9757	- .9709	.2964	.2944	.2924
36	-1.0017	- .9966	- .9916	.3114	.3093	.3073
37	-1.0224	-1.0171	-1.0119	.3267	.3244	.3221
38	-1.0426	-1.0372	-1.0318	.3423	.3398	.3374
39	-1.0625	-1.0568	-1.0512	.3581	.3555	.3529
40	-1.0820	-1.0761	-1.0703	.3741	.3713	.3685
41	-1.1010	-1.0949	-1.0889	.3904	.3874	.3845
42	-1.1197	-1.1134	-1.1071	.4069	.4037	.4006
43	-1.1372	-1.1314	-1.1250	.4236	.4203	.4169
44	-1.1558	-1.1491	-1.1424	.4406	.4370	.4335

$180° - \phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
45	1.2340	1.2192	1.2046	1.2920	1.2839	1.2760
46	1.2431	1.2290	1.2130	1.3163	1.3080	1.2998
47	1.2524	1.2369	1.2216	1.3406	1.3320	1.3234
48	1.2517	1.2455	1.2302	1.3648	1.3559	1.3470
49	1.2712	1.2550	1.2390	1.3888	1.3796	1.3705
50	1.2808	1.2642	1.2479	1.4128	1.4033	1.3938
51	1.2905	1.2736	1.2569	1.4367	1.4269	1.4171
52	1.3004	1.2831	1.2660	1.4606	1.4504	1.4403
53	1.3103	1.2926	1.2752	1.4844	1.4739	1.4635
54	1.3203	1.3023	1.2845	1.5081	1.4973	1.4866
55	1.3305	1.3121	1.2940	1.5318	1.5207	1.5096
56	1.3408	1.3220	1.3035	1.5555	1.5440	1.5327
57	1.3512	1.3320	1.3131	1.5791	1.5674	1.5557
58	1.3617	1.3422	1.3229	1.6028	1.5907	1.5786
59	1.3724	1.3524	1.3328	1.6264	1.6140	1.6016
50	1.3831	1.3628	1.3428	1.6501	1.6373	1.6246
61	1.3940	1.3733	1.3529	1.6738	1.6606	1.6476
62	1.4050	1.3839	1.3631	1.6975	1.6840	1.6706
63	1.4162	1.3945	1.3734	1.7213	1.7074	1.6937
64	1.4274	1.4055	1.3839	1.7451	1.7309	1.7168
65	1.4388	1.4165	1.3945	1.7690	1.7544	1.7399
66	1.4503	1.4276	1.4052	1.7930	1.7780	1.7632
67	1.4620	1.4388	1.4160	1.8170	1.8017	1.7865
68	1.4738	1.4502	1.4270	1.8412	1.8255	1.8099
69	1.4857	1.4617	1.4381	1.8655	1.8494	1.8334
70	1.4978	1.4734	1.4493	1.8899	1.8734	1.8570
71	1.5101	1.4852	1.4607	1.9145	1.8975	1.8808
72	1.5225	1.4971	1.4722	1.9392	1.9219	1.9047
73	1.5350	1.5092	1.4838	1.9641	1.9463	1.9288
74	1.5478	1.5215	1.4956	1.9892	1.9710	1.9530
75	1.5606	1.5339	1.5076	2.0145	1.9958	1.9774
76	1.5737	1.5465	1.5197	2.0400	2.0209	2.0021
77	1.5870	1.5592	1.5320	2.0657	2.0462	2.0269
78	1.6004	1.5722	1.5445	2.0917	2.0718	2.0520
79	1.6140	1.5853	1.5571	2.1180	2.0976	2.0774
80	1.6278	1.5986	1.5699	2.1446	2.1237	2.1030
81	1.6419	1.6121	1.5830	2.1714	2.1500	2.1289
82	1.6561	1.6259	1.5963	2.1986	2.1768	2.1551
83	1.6706	1.6398	1.6096	2.2262	2.2038	2.1817
84	1.6852	1.6537	1.6237	2.2541	2.2312	2.2086
85	1.7002	1.6683	1.6370	2.2825	2.2590	2.2359
86	1.7154	1.6823	1.6511	2.3112	2.2873	2.2636
87	1.7308	1.6979	1.6654	2.3405	2.3159	2.2917
88	1.7465	1.7123	1.6799	2.3702	2.3451	2.3203
89	1.7625	1.7278	1.6947	2.4004	2.3747	2.3493
90	1.7788	1.7439	1.7098	2.4311	2.4049	2.3789

180°-φ°	ξ			η		
45	-1.1733	-1.1663	-1.1595	.4578	.4540	.4503
46	-1.1903	-1.1832	-1.1761	.4751	.4712	.4672
47	-1.2070	-1.1997	-1.1924	.4928	.4886	.4844
48	-1.2234	-1.2158	-1.2084	.5106	.5061	.5018
49	-1.2393	-1.2316	-1.2239	.5286	.5239	.5193
50	-1.2549	-1.2470	-1.2391	.5468	.5419	.5371
51	-1.2701	-1.2620	-1.2539	.5653	.5602	.5551
52	-1.2849	-1.2766	-1.2684	.5839	.5786	.5733
53	-1.2994	-1.2909	-1.2824	.6028	.5972	.5916
54	-1.3135	-1.3048	-1.2962	.6219	.6160	.6102
55	-1.3273	-1.3184	-1.3096	.6412	.6350	.6290
56	-1.3407	-1.3316	-1.3226	.6607	.6543	.6479
57	-1.3538	-1.3445	-1.3353	.6804	.6737	.6671
58	-1.3665	-1.3570	-1.3477	.7004	.6934	.6865
59	-1.3788	-1.3692	-1.3596	.7205	.7133	.7061
60	-1.3909	-1.3810	-1.3713	.7409	.7334	.7259
61	-1.4025	-1.3925	-1.3826	.7615	.7537	.7459
62	-1.4138	-1.4037	-1.3936	.7824	.7742	.7661
63	-1.4248	-1.4145	-1.4043	.8035	.7950	.7866
64	-1.4354	-1.4250	-1.4146	.8248	.8160	.8072
65	-1.4457	-1.4351	-1.4245	.8464	.8372	.8281
66	-1.4557	-1.4449	-1.4342	.8682	.8587	.8493
67	-1.4653	-1.4543	-1.4435	.8902	.8804	.8707
68	-1.4745	-1.4634	-1.4524	.9126	.9024	.8923
69	-1.4834	-1.4722	-1.4610	.9352	.9246	.9142
70	-1.4920	-1.4806	-1.4693	.9581	.9471	.9363
71	-1.5002	-1.4887	-1.4773	.9812	.9699	.9587
72	-1.5080	-1.4964	-1.4848	1.0047	.9929	.9814
73	-1.5155	-1.5037	-1.4921	1.0284	1.0163	1.0043
74	-1.5226	-1.5107	-1.4990	1.0524	1.0399	1.0276
75	-1.5294	-1.5174	-1.5055	1.0768	1.0639	1.0511
76	-1.5358	-1.5237	-1.5117	1.1015	1.0881	1.0750
77	-1.5418	-1.5296	-1.5175	1.1265	1.1127	1.0991
78	-1.5474	-1.5351	-1.5229	1.1519	1.1377	1.1236
79	-1.5526	-1.5402	-1.5279	1.1777	1.1530	1.1485
80	-1.5575	-1.5450	-1.5326	1.2038	1.1886	1.1737
81	-1.5619	-1.5493	-1.5369	1.2303	1.2146	1.1992
82	-1.5659	-1.5533	-1.5408	1.2572	1.2411	1.2252
83	-1.5695	-1.5568	-1.5442	1.2845	1.2679	1.2515
84	-1.5727	-1.5599	-1.5473	1.3123	1.2951	1.2782
85	-1.5754	-1.5626	-1.5499	1.3405	1.3228	1.3054
86	-1.5777	-1.5648	-1.5521	1.3692	1.3509	1.3330
87	-1.5794	-1.5665	-1.5538	1.3983	1.3796	1.3611
88	-1.5807	-1.5678	-1.5550	1.4280	1.4087	1.3896
89	-1.5815	-1.5686	-1.5558	1.4583	1.4383	1.4187
90	-1.5818	-1.5689	-1.5560	1.4890	1.4684	1.4483

$$\phi_c = 45°$$

180°-φ°	τ			e		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
0	1.0000	1.0000	1.0000	.0000	.0000	.0000
1	.9999	.9997	.9994	.0247	.0247	.0247
2	1.0001	.9996	.9991	.0493	.0493	.0493
3	1.0006	.9999	.9991	.0740	.0740	.0739
4	1.0014	1.0005	.9995	.0986	.0986	.0985
5	1.0026	1.0013	1.0001	.1232	.1231	.1231
6	1.0040	1.0025	1.0010	.1478	.1477	.1475
7	1.0057	1.0040	1.0022	.1723	.1721	.1720
8	1.0077	1.0057	1.0038	.1967	.1966	.1964
9	1.0100	1.0078	1.0056	.2212	.2209	.2207
10	1.0126	1.0101	1.0077	.2455	.2452	.2449
11	1.0155	1.0128	1.0101	.2698	.2695	.2691
12	1.0187	1.0157	1.0127	.2940	.2936	.2932
13	1.0221	1.0189	1.0157	.3182	.3177	.3172
14	1.0259	1.0224	1.0189	.3423	.3417	.3411
15	1.0299	1.0261	1.0224	.3663	.3656	.3650
16	1.0342	1.0302	1.0262	.3902	.3895	.3887
17	1.0387	1.0345	1.0302	.4141	.4132	.4124
18	1.0435	1.0390	1.0345	.4378	.4369	.4359
19	1.0486	1.0438	1.0391	.4615	.4604	.4594
20	1.0539	1.0489	1.0439	.4851	.4839	.4827
21	1.0595	1.0542	1.0490	.5086	.5073	.5060
22	1.0653	1.0598	1.0543	.5320	.5306	.5292
23	1.0714	1.0656	1.0598	.5553	.5538	.5522
24	1.0777	1.0717	1.0656	.5785	.5769	.5752
25	1.0843	1.0780	1.0717	.6016	.5999	.5981
26	1.0911	1.0845	1.0779	.6247	.6228	.6209
27	1.0981	1.0912	1.0844	.6477	.6456	.6435
28	1.1053	1.0982	1.0911	.6705	.6683	.6661
29	1.1128	1.1054	1.0980	.6933	.6910	.6886
30	1.1205	1.1128	1.1051	.7161	.7135	.7110
31	1.1284	1.1204	1.1125	.7387	.7360	.7334
32	1.1365	1.1282	1.1200	.7613	.7584	.7556
33	1.1448	1.1363	1.1278	.7837	.7808	.7778
34	1.1533	1.1445	1.1357	.8062	.8030	.7999
35	1.1621	1.1529	1.1439	.8285	.8252	.8219
36	1.1710	1.1616	1.1522	.8508	.8473	.8438
37	1.1801	1.1704	1.1608	.8731	.8694	.8657
38	1.1895	1.1795	1.1695	.8953	.8914	.8875
39	1.1990	1.1887	1.1785	.9174	.9134	.9093
40	1.2087	1.1981	1.1876	.9395	.9353	.9310
41	1.2186	1.2077	1.1969	.9616	.9572	.9527
42	1.2288	1.2175	1.2064	.9837	.9790	.9744
43	1.2391	1.2275	1.2161	1.0057	1.0008	.9960
44	1.2495	1.2377	1.2259	1.0277	1.0226	1.0176

180°-φ	ξ			η		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
0	.0000	.0000	.0000	.0000	.0000	.0000
1	- .0247	- .0247	- .0247	.0002	.0002	.0002
2	- .0493	- .0493	- .0493	.0009	.0009	.0009
3	- .0740	- .0739	- .0739	.0019	.0019	.0019
4	- .0985	- .0985	- .0984	.0034	.0034	.0034
5	- .1231	- .1230	- .1229	.0054	.0054	.0054
6	- .1475	- .1474	- .1473	.0077	.0077	.0077
7	- .1719	- .1717	- .1716	.0105	.0105	.0105
8	- .1961	- .1959	- .1957	.0137	.0137	.0137
9	- .2203	- .2200	- .2198	.0173	.0173	.0172
10	- .2443	- .2440	- .2437	.0213	.0213	.0212
11	- .2682	- .2678	- .2674	.0257	.0257	.0257
12	- .2919	- .2915	- .2911	.0306	.0305	.0305
13	- .3155	- .3150	- .3145	.0358	.0357	.0357
14	- .3389	- .3383	- .3378	.0414	.0413	.0412
15	- .3622	- .3615	- .3608	.0474	.0473	.0472
16	- .3852	- .3845	- .3837	.0538	.0537	.0536
17	- .4081	- .4072	- .4064	.0606	.0604	.0603
18	- .4307	- .4298	- .4289	.0678	.0676	.0674
19	- .4532	- .4521	- .4511	.0753	.0750	.0748
20	- .4754	- .4743	- .4731	.0831	.0829	.0826
21	- .4974	- .4962	- .4949	.0914	.0911	.0907
22	- .5192	- .5178	- .5165	.0999	.0996	.0992
23	- .5407	- .5393	- .5378	.1089	.1085	.1081
24	- .5620	- .5605	- .5589	.1181	.1177	.1172
25	- .5831	- .5814	- .5797	.1277	.1272	.1267
26	- .6039	- .6021	- .6002	.1376	.1371	.1365
27	- .6244	- .6225	- .6205	.1479	.1473	.1466
28	- .6447	- .6427	- .6406	.1585	.1578	.1571
29	- .6648	- .6626	- .6603	.1693	.1686	.1678
30	- .6845	- .6822	- .6798	.1805	.1797	.1788
31	- .7040	- .7016	- .6991	.1920	.1911	.1902
32	- .7233	- .7207	- .7181	.2038	.2028	.2018
33	- .7422	- .7395	- .7367	.2159	.2148	.2137
34	- .7610	- .7581	- .7552	.2283	.2271	.2259
35	- .7794	- .7763	- .7733	.2409	.2396	.2384
36	- .7975	- .7944	- .7912	.2539	.2525	.2511
37	- .8154	- .8121	- .8088	.2671	.2656	.2641
38	- .8330	- .8296	- .8261	.2806	.2790	.2774
39	- .8504	- .8467	- .8431	.2944	.2927	.2910
40	- .8674	- .8637	- .8599	.3085	.3066	.3048
41	- .8842	- .8803	- .8764	.3228	.3208	.3189
42	- .9007	- .8967	- .8926	.3374	.3353	.3332
43	- .9170	- .9127	- .9085	.3523	.3501	.3478
44	- .9329	- .9286	- .9242	.3675	.3651	.3627

$180° - \phi°$	τ			σ		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
45	1.2602	1.2480	1.2360	1.0497	1.0444	1.0392
46	1.2711	1.2586	1.2462	1.0717	1.0662	1.0608
47	1.2822	1.2693	1.2566	1.0937	1.0880	1.0823
48	1.2934	1.2803	1.2672	1.1157	1.1098	1.1039
49	1.3049	1.2914	1.2780	1.1377	1.1316	1.1255
50	1.3165	1.3027	1.2890	1.1598	1.1534	1.1470
51	1.3283	1.3141	1.3001	1.1819	1.1752	1.1687
52	1.3403	1.3258	1.3114	1.2040	1.1971	1.1903
53	1.3526	1.3377	1.3230	1.2262	1.2191	1.2120
54	1.3650	1.3497	1.3347	1.2484	1.2410	1.2337
55	1.3776	1.3620	1.3466	1.2707	1.2631	1.2555
56	1.3904	1.3744	1.3586	1.2931	1.2852	1.2774
57	1.4034	1.3871	1.3709	1.3155	1.3074	1.2993
58	1.4166	1.3999	1.3834	1.3381	1.3297	1.3214
59	1.4301	1.4130	1.3961	1.3607	1.3521	1.3435
60	1.4437	1.4262	1.4089	1.3835	1.3746	1.3657
61	1.4576	1.4397	1.4220	1.4064	1.3972	1.3881
62	1.4717	1.4534	1.4353	1.4294	1.4199	1.4105
63	1.4860	1.4673	1.4488	1.4526	1.4428	1.4331
64	1.5005	1.4814	1.4625	1.4760	1.4659	1.4559
65	1.5153	1.4958	1.4765	1.4995	1.4891	1.4788
66	1.5303	1.5103	1.4906	1.5232	1.5125	1.5019
67	1.5456	1.5252	1.5050	1.5471	1.5361	1.5252
68	1.5611	1.5402	1.5197	1.5712	1.5599	1.5487
69	1.5769	1.5556	1.5345	1.5955	1.5839	1.5724
70	1.5929	1.5711	1.5497	1.6201	1.6082	1.5963
71	1.6092	1.5870	1.5651	1.6450	1.6327	1.6205
72	1.6258	1.6031	1.5807	1.6701	1.6574	1.6449
73	1.6427	1.6195	1.5966	1.6955	1.6825	1.6696
74	1.6599	1.6362	1.6128	1.7212	1.7079	1.6946
75	1.6774	1.6532	1.6293	1.7473	1.7335	1.7199
76	1.6952	1.6705	1.6461	1.7737	1.7596	1.7456
77	1.7133	1.6881	1.6632	1.8005	1.7860	1.7716
78	1.7318	1.7060	1.6806	1.8277	1.8127	1.7980
79	1.7507	1.7243	1.6984	1.8553	1.8399	1.8247
80	1.7699	1.7430	1.7165	1.8833	1.8675	1.8519
81	1.7895	1.7620	1.7349	1.9118	1.8956	1.8796
82	1.8095	1.7814	1.7537	1.9408	1.9242	1.9077
83	1.8299	1.8012	1.7730	1.9704	1.9533	1.9363
84	1.8507	1.8214	1.7926	2.0005	1.9829	1.9655
85	1.8720	1.8421	1.8126	2.0312	2.0131	1.9952
86	1.8938	1.8632	1.8331	2.0625	2.0439	2.0255
87	1.9161	1.8848	1.8540	2.0945	2.0754	2.0565
88	1.9388	1.9068	1.8754	2.1272	2.1075	2.0881
89	1.9621	1.9294	1.8973	2.1606	2.1404	2.1204
90	1.9860	1.9526	1.9197	2.1949	2.1741	2.1536

180°-φ°	ξ			η		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
45	- .9486	- .9441	- .9396	.3829	.3803	.3778
46	- .9640	- .9594	- .9547	.3986	.3959	.3932
47	- .9792	- .9744	- .9696	.4145	.4117	.4088
48	- .9941	- .9891	- .9841	.4307	.4277	.4247
49	-1.0086	-1.0035	- .9964	.4472	.4440	.4409
50	-1.0230	-1.0177	-1.0125	.4640	.4606	.4573
51	-1.0370	-1.0316	-1.0262	.4810	.4775	.4740
52	-1.0508	-1.0452	-1.0397	.4984	.4946	.4909
53	-1.0643	-1.0586	-1.0529	.5160	.5120	.5081
54	-1.0775	-1.0716	-1.0658	.5338	.5297	.5256
55	-1.0904	-1.0844	-1.0785	.5520	.5476	.5434
56	-1.1031	-1.0970	-1.0909	.5704	.5659	.5614
57	-1.1155	-1.1092	-1.1030	.5891	.5844	.5797
58	-1.1276	-1.1212	-1.1148	.6082	.6032	.5983
59	-1.1395	-1.1329	-1.1264	.6275	.6223	.6171
60	-1.1510	-1.1443	-1.1376	.6471	.6417	.6363
61	-1.1623	-1.1554	-1.1486	.6670	.6613	.6557
62	-1.1733	-1.1663	-1.1594	.6873	.6813	.6755
63	-1.1840	-1.1769	-1.1698	.7078	.7016	.6955
64	-1.1944	-1.1872	-1.1800	.7287	.7223	.7159
65	-1.2045	-1.1972	-1.1898	.7499	.7432	.7366
66	-1.2144	-1.2069	-1.1994	.7715	.7645	.7576
67	-1.2239	-1.2163	-1.2087	.7934	.7861	.7789
68	-1.2331	-1.2254	-1.2177	.8157	.8081	.8006
69	-1.2421	-1.2342	-1.2264	.8384	.8305	.8227
70	-1.2507	-1.2427	-1.2347	.8614	.8532	.8451
71	-1.2590	-1.2508	-1.2428	.8848	.8763	.8679
72	-1.2669	-1.2587	-1.2506	.9087	.8998	.8910
73	-1.2746	-1.2662	-1.2580	.9329	.9237	.9146
74	-1.2819	-1.2734	-1.2651	.9576	.9480	.9386
75	-1.2888	-1.2803	-1.2718	.9827	.9728	.9630
76	-1.2955	-1.2868	-1.2783	1.0083	.9980	.9878
77	-1.3017	-1.2930	-1.2843	1.0343	1.0236	1.0131
78	-1.3076	-1.2988	-1.2900	1.0608	1.0498	1.0388
79	-1.3131	-1.3042	-1.2954	1.0879	1.0764	1.0651
80	-1.3182	-1.3092	-1.3003	1.1154	1.1035	1.0918
81	-1.3229	-1.3139	-1.3049	1.1435	1.1312	1.1191
82	-1.3272	-1.3181	-1.3091	1.1722	1.1595	1.1469
83	-1.3310	-1.3219	-1.3128	1.2015	1.1883	1.1753
84	-1.3344	-1.3252	-1.3161	1.2314	1.2177	1.2042
85	-1.3374	-1.3281	-1.3189	1.2620	1.2478	1.2338
86	-1.3398	-1.3305	-1.3213	1.2932	1.2785	1.2641
87	-1.3418	-1.3325	-1.3232	1.3251	1.3099	1.2950
88	-1.3432	-1.3339	-1.3246	1.3578	1.3421	1.3266
89	-1.3441	-1.3347	-1.3254	1.3912	1.3749	1.3589
90	-1.3444	-1.3350	-1.3257	1.4255	1.4086	1.3920

$$\phi_c = 50°$$

180°−φ°	τ			σ		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
0	1.0000	1.0000	1.0000	.0000	.0000	.0000
1	1.0000	.9998	.9996	.0191	.0191	.0191
2	1.0002	.9998	.9995	.0382	.0382	.0382
3	1.0008	1.0002	.9996	.0573	.0573	.0573
4	1.0017	1.0009	1.0001	.0764	.0764	.0764
5	1.0028	1.0019	1.0009	.0955	.0955	.0954
6	1.0043	1.0032	1.0020	.1146	.1145	.1145
7	1.0061	1.0048	1.0034	.1337	.1336	.1335
8	1.0082	1.0067	1.0051	.1527	.1526	.1525
9	1.0106	1.0088	1.0071	.1718	.1716	.1715
10	1.0132	1.0113	1.0094	.1908	.1906	.1905
11	1.0162	1.0141	1.0120	.2098	.2096	.2094
12	1.0195	1.0172	1.0149	.2289	.2286	.2283
13	1.0231	1.0205	1.0180	.2479	.2476	.2472
14	1.0269	1.0242	1.0215	.2668	.2665	.2661
15	1.0311	1.0281	1.0252	.2858	.2854	.2850
16	1.0355	1.0324	1.0293	.3048	.3043	.3039
17	1.0402	1.0369	1.0336	.3237	.3232	.3227
18	1.0452	1.0417	1.0382	.3427	.3421	.3415
19	1.0505	1.0468	1.0431	.3616	.3609	.3603
20	1.0561	1.0522	1.0482	.3805	.3798	.3791
21	1.0619	1.0578	1.0537	.3994	.3986	.3978
22	1.0681	1.0637	1.0594	.4183	.4174	.4166
23	1.0745	1.0699	1.0654	.4372	.4362	.4353
24	1.0812	1.0764	1.0716	.4561	.4550	.4540
25	1.0881	1.0831	1.0781	.4749	.4738	.4727
26	1.0954	1.0901	1.0849	.4938	.4925	.4914
27	1.1029	1.0974	1.0920	.5127	.5114	.5101
28	1.1106	1.1049	1.0993	.5316	.5302	.5288
29	1.1187	1.1128	1.1069	.5505	.5490	.5475
30	1.1270	1.1208	1.1147	.5694	.5678	.5652
31	1.1356	1.1292	1.1228	.5883	.5866	.5849
32	1.1444	1.1378	1.1312	.6072	.6054	.6036
33	1.1535	1.1466	1.1398	.6261	.6242	.6223
34	1.1629	1.1557	1.1487	.6451	.6431	.6411
35	1.1725	1.1651	1.1578	.6641	.6620	.6598
36	1.1824	1.1748	1.1672	.6831	.6809	.6786
37	1.1925	1.1847	1.1769	.7022	.6998	.6974
38	1.2030	1.1948	1.1868	.7213	.7187	.7162
39	1.2136	1.2052	1.1969	.7404	.7378	.7351
40	1.2246	1.2159	1.2073	.7596	.7568	.7540
41	1.2358	1.2269	1.2180	.7788	.7759	.7730
42	1.2473	1.2381	1.2289	.7981	.7951	.7920
43	1.2590	1.2495	1.2401	.8175	.8143	.8111
44	1.2711	1.2613	1.2516	.8369	.8336	.8302

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$180°-\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
0	.0000	.0000	.0000	.0000	.0000	.0000
1	-.0191	-.0191	-.0191	.0002	.0002	.0002
2	-.0382	-.0382	-.0382	.0007	.0007	.0007
3	-.0573	-.0573	-.0573	.0015	.0015	.0015
4	-.0764	-.0763	-.0763	.0027	.0027	.0027
5	-.0954	-.0954	-.0953	.0042	.0042	.0042
6	-.1144	-.1143	-.1143	.0060	.0060	.0060
7	-.1333	-.1333	-.1332	.0083	.0081	.0081
8	-.1522	-.1521	-.1520	.0106	.0106	.0106
9	-.1711	-.1709	-.1708	.0135	.0134	.0134
10	-.1899	-.1897	-.1895	.0166	.0166	.0166
11	-.2086	-.2083	-.2081	.0201	.0200	.0200
12	-.2272	-.2269	-.2267	.0239	.0238	.0238
13	-.2457	-.2454	-.2451	.0280	.0279	.0279
14	-.2642	-.2639	-.2635	.0324	.0323	.0323
15	-.2826	-.2822	-.2818	.0372	.0371	.0370
16	-.3008	-.3004	-.2999	.0422	.0421	.0420
17	-.3190	-.3185	-.3180	.0476	.0475	.0474
18	-.3371	-.3365	-.3359	.0533	.0532	.0530
19	-.3550	-.3544	-.3538	.0593	.0592	.0590
20	-.3728	-.3721	-.3714	.0656	.0654	.0653
21	-.3905	-.3898	-.3690	.0722	.0720	.0718
22	-.4081	-.4073	-.4065	.0792	.0789	.0787
23	-.4256	-.4247	-.4238	.0864	.0861	.0859
24	-.4429	-.4419	-.4409	.0939	.0936	.0933
25	-.4601	-.4590	-.4580	.1017	.1014	.1011
26	-.4771	-.4760	-.4748	.1099	.1095	.1092
27	-.4940	-.4928	-.4916	.1183	.1179	.1175
28	-.5108	-.5094	-.5081	.1270	.1266	.1261
29	-.5273	-.5260	-.5246	.1360	.1355	.1350
30	-.5436	-.5423	-.5408	.1453	.1448	.1443
31	-.5601	-.5585	-.5570	.1549	.1543	.1537
32	-.5762	-.5746	-.5729	.1648	.1642	.1635
33	-.5922	-.5904	-.5887	.1750	.1743	.1736
34	-.6080	-.6062	-.6043	.1855	.1847	.1839
35	-.6237	-.6217	-.6198	.1962	.1954	.1945
36	-.6391	-.6371	-.6351	.2073	.2064	.2054
37	-.6545	-.6523	-.6502	.2186	.2176	.2166
38	-.6696	-.6674	-.6651	.2302	.2292	.2281
39	-.6846	-.6822	-.6799	.2421	.2410	.2399
40	-.6994	-.6969	-.6945	.2543	.2531	.2519
41	-.7140	-.7115	-.7089	.2668	.2655	.2642
42	-.7285	-.7258	-.7231	.2796	.2782	.2768
43	-.7427	-.7400	-.7372	.2927	.2912	.2897
44	-.7568	-.7540	-.7511	.3061	.3045	.3029

180°-ϕ	τ			σ		
	f = 0.01	f = 0 02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
45	1.2833	1.2733	1.2633	.6564	.8529	.8494
46	1.2959	1.2856	1.2753	.8760	.8724	.8687
47	1.3087	1.2981	1.2875	.8957	.8919	.8881
48	1.3219	1.3109	1.3000	.9155	.9115	.9076
49	1.3353	1.3240	1.3128	.9354	.9312	.9271
50	1.3489	1.3374	1.3259	.9554	.9511	.9468
51	1.3629	1.3510	1.3392	.9755	.9710	.9666
52	1.3772	1.3650	1.3538	.9958	.9911	.9864
53	1.3917	1.3792	1.3668	1.0162	1.0113	1.0065
54	1.4056	1.3937	1.3809	1.0367	1.0317	1.0266
55	1.4219	1.4085	1.3954	1.0574	1.0521	1.0469
56	1.4373	1.4237	1.4102	1.0782	1.0728	1.0674
57	1.4531	1.4391	1.4253	1.0993	1.0936	1.0880
58	1.4692	1.4549	1.4407	1.1205	1.1147	1.1089
59	1.4857	1.4710	1.4564	1.1419	1.1359	1.1299
60	1.5024	1.4874	1.4725	1.1635	1.1573	1.1510
61	1.5196	1.5041	1.4888	1.1854	1.1789	1.1725
62	1.5371	1.5212	1.5055	1.2075	1.2008	1.1941
63	1.5549	1.5397	1.5226	1.2298	1.2229	1.2160
64	1.5732	1.5565	1.5400	1.2524	1.2452	1.2381
65	1.5918	1.5747	1.5578	1.2753	1.2678	1.2605
66	1.6108	1.5933	1.5759	1.2984	1.2907	1.2831
67	1.6302	1.6122	1.5944	1.3219	1.3140	1.3061
68	1.6501	1.6316	1.6134	1.3457	1.3375	1.3294
69	1.6703	1.6514	1.6327	1.3698	1.3614	1.3530
70	1.6910	1.6716	1.6525	1.3943	1.3856	1.3769
71	1.7122	1.6923	1.6727	1.4192	1.4102	1.4012
72	1.7336	1.7135	1.6933	1.4445	1.4352	1.4259
73	1.7560	1.7351	1.7144	1.4702	1.4606	1.4510
74	1.7786	1.7572	1.7360	1.4964	1.4865	1.4766
75	1.8018	1.7798	1.7581	1.5230	1.5128	1.5026
76	1.8255	1.8030	1.7807	1.5502	1.5396	1.5291
77	1.8498	1.8267	1.8039	1.5779	1.5669	1.5561
78	1.8747	1.8510	1.8276	1.6061	1.5948	1.5836
79	1.9002	1.8759	1.8519	1.6350	1.6233	1.6117
80	1.9264	1.9014	1.8768	1.6644	1.6524	1.6404
81	1.9532	1.9276	1.9024	1.6946	1.6821	1.6698
82	1.9808	1.9545	1.9286	1.7254	1.7126	1.6998
83	2.0090	1.9821	1.9555	1.7570	1.7437	1.7306
84	2.0381	2.0104	1.9832	1.7894	1.7757	1.7621
85	2.0679	2.0396	2.0116	1.8226	1.8085	1.7944
86	2.0987	2.0695	2.0408	1.8567	1.8421	1.8276
87	2.1303	2.1003	2.0708	1.8918	1.8767	1.8617
88	2.1628	2.1321	2.1018	1.9279	1.9123	1.8968
89	2.1964	2.1648	2.1337	1.9651	1.9489	1.9329
90	2.2310	2.1985	2.1665	2.0034	1.9867	1.9702

$\phi_c = 50°$ (continued)

Table 3

180°-ϕ°	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
45	- .7708	- .7678	- .7648	.3197	.3160	.3163
46	- .7845	- .7814	- .7783	.3337	.3319	.3301
47	- .7980	- .7948	- .7917	.3480	.3461	.3441
48	- .8114	- .8081	- .8048	.3626	.3605	.3585
49	- .8246	- .8212	- .8178	.3775	.3753	.3731
50	- .8376	- .8340	- .8305	.3927	.3904	.3881
51	- .8504	- .8467	- .8431	.4082	.4058	.4033
52	- .8630	- .8592	- .8555	.4241	.4215	.4189
53	- .8754	- .8715	- .8677	.4402	.4375	.4348
54	- .8876	- .8836	- .8797	.4567	.4539	.4510
55	- .8996	- .8955	- .8915	.4736	.4706	.4675
56	- .9114	- .9072	- .9031	.4908	.4876	.4844
57	- .9230	- .9187	- .9145	.5083	.5050	.5016
58	- .9344	- .9300	- .9256	.5262	.5227	.5192
59	- .9456	- .9411	- .9366	.5445	.5408	.5371
60	- .9566	- .9520	- .9474	.5631	.5592	.5553
61	- .9674	- .9626	- .9579	.5821	.5780	.5740
62	- .9779	- .9730	- .9682	.6015	.5972	.5930
63	- .9882	- .9832	- .9783	.6213	.6168	.6124
64	- .9983	- .9932	- .9882	.6416	.6369	.6322
65	-1.0081	-1.0030	- .9978	.6622	.6573	.6524
66	-1.0177	-1.0125	-1.0072	.6833	.6781	.6730
67	-1.0271	-1.0217	-1.0164	.7048	.6994	.6941
68	-1.0362	-1.0307	-1.0253	.7268	.7212	.7156
69	-1.0451	-1.0395	-1.0339	.7492	.7434	.7375
70	-1.0536	-1.0480	-1.0423	.7722	.7661	.7600
71	-1.0619	-1.0562	-1.0504	.7956	.7892	.7829
72	-1.0700	-1.0641	-1.0583	.8196	.8130	.8063
73	-1.0777	-1.0717	-1.0658	.8442	.8372	.8303
74	-1.0851	-1.0791	-1.0731	.8693	.8620	.8548
75	-1.0923	-1.0861	-1.0800	.8949	.8873	.8798
76	-1.0990	-1.0928	-1.0867	.9212	.9133	.9055
77	-1.1055	-1.0992	-1.0930	.9481	.9399	.9317
78	-1.1116	-1.1052	-1.0989	.9757	.9671	.9586
79	-1.1174	-1.1109	-1.1045	1.0040	.9950	.9861
80	-1.1227	-1.1162	-1.1098	1.0330	1.0236	1.0144
81	-1.1277	-1.1211	-1.1146	1.0627	1.0530	1.0433
82	-1.1323	-1.1256	-1.1190	1.0932	1.0831	1.0730
83	-1.1364	-1.1297	-1.1231	1.1245	1.1140	1.1035
84	-1.1401	-1.1333	-1.1266	1.1567	1.1457	1.1348
85	-1.1432	-1.1365	-1.1297	1.1898	1.1783	1.1670
86	-1.1459	-1.1391	-1.1323	1.2238	1.2119	1.2001
87	-1.1481	-1.1412	-1.1344	1.2588	1.2464	1.2342
88	-1.1496	-1.1427	-1.1359	1.2949	1.2820	1.2692
89	-1.1506	-1.1437	-1.1369	1.3320	1.3186	1.3053
90	-1.1509	-1.1440	-1.1372	1.3704	1.3564	1.3426

180°−ϕ°	τ			σ		
	f = 0.01	f = 0.02	f = 0.03	f = C.01	f = 0.02	f = 0.03
0	1.0000	1.0000	1.0000	.0000	.0000	.0000
1	1.0000	.9999	.9997	.0149	.0149	.0149
2	1.0003	1.0000	.9997	.0298	.0898	.0298
3	1.0009	1.0005	1.0000	..0448	.0447	.0447
4	1.0018	1.0012	1.0006	.0597	.0597	.0596
5	1.0031	1.0023	1.0016	.0746	.0746	.0745
6	1.0046	1.0037	1.0028	.0895	.0895	.0894
7	1.0064	1.0054	1.0043	.1045	.1044	.1043
8	1.0085	1.0073	1.0061	.1194	.1193	.1192
9	1.0110	1.0096	1.0083	.1343	.1343	.1342
10	1.0137	1.0122	1.0107	.1493	.1492	.1491
11	1.0168	1.0151	1.0134	.1643	.1641	.1640
12	1.0201	1.0183	1.0165	.1793	.1791	.1789
13	1.0238	1.0218	1.0198	.1943	.1941	.1939
14	1.0277	1.0256	1.0234	.2093	.2091	.2088
15	1.0320	1.0297	1.0274	.2243	.2241	.2238
16	1.0365	1.0341	1.0316	.2394	.2391	.2388
17	1.0414	1.0388	1.0362	.2545	.2541	.2538
18	1.0465	1.0438	1.0410	.2696	.2692	.2688
19	1.0520	1.0491	1.0461	.2847	.2843	.2839
20	1.0578	1.0547	1.0516	.2999	.2994	.2990
21	1.0638	1.0606	1.0573	.3151	.3146	.3141
22	1.0702	1.0668	1.0633	.3303	.3297	.3292
23	1.0769	1.0733	1.0697	.3456	.3450	.3444
24	1.0839	1.0801	1.0763	.3609	.3602	.3596
25	1.0912	1.0872	1.0832	.3762	.3755	.3748
26	1.0988	1.0946	1.0905	.3916	.3909	.3901
27	1.1067	1.1023	1.0980	.4071	.4062	.4054
28	1.1149	1.1104	1.1059	.4226	.4217	.4208
29	1.1234	1.1187	1.1140	.4381	.4372	.4362
30	1.1323	1.1274	1.1225	.4537	.4527	.4517
31	1.1414	1.1363	1.1312	.4694	.4683	.4672
32	1.1509	1.1456	1.1403	.4851	.4840	.4828
33	1.1607	1.1552	1.1497	.5010	.4997	.4985
34	1.1708	1.1651	1.1594	.5169	.5156	.5143
35	1.1812	1.1753	1.1694	.5328	.5314	.5301
36	1.1920	1.1858	1.1797	.5489	.5474	.5460
37	1.2030	1.1967	1.1903	.5650	.5635	.5619
38	1.2144	1.2078	1.2013	.5813	.5797	.5780
39	1.2262	1.2194	1.2126	.5976	.5959	.5942
40	1.2383	1.2312	1.2242	.6141	.6123	.6104
41	1.2507	1.2434	1.2361	.6306	.6287	.6268
42	1.2634	1.2559	1.2484	.6473	.6453	.6433
43	1.2766	1.2688	1.2611	.6641	.6620	.6599
44	1.2900	1.2820	1.2740	.6811	.6789	.6766

$180°-\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
0	.0000	.0000	.0000	.0000	.0000	.0000
1	-.0149	-.0149	-.0149	.0001	.0001	.0001
2	-.0298	-.0298	-.0298	.0005	.0005	.0005
3	-.0447	-.0447	-.0447	.0012	.0012	.0012
4	-.0596	-.0596	-.0596	.0021	.0021	.0021
5	-.0745	-.0745	-.0744	.0033	.0033	.0033
6	-.0894	-.0893	-.0893	.0047	.0047	.0047
7	-.1042	-.1041	-.1041	.0064	.0064	.0064
8	-.1190	-.1189	-.1189	.0083	.0083	.0083
9	-.1338	-.1337	-.1336	.0105	.0105	.0105
10	-.1485	-.1484	-.1483	.0130	.0130	.0130
11	-.1633	-.1631	-.1630	.0157	.0157	.0157
12	-.1780	-.1778	-.1776	.0187	.0187	.0187
13	-.1926	-.1924	-.1922	.0220	.0219	.0219
14	-.2072	-.2070	-.2068	.0255	.0254	.0254
15	-.2218	-.2215	-.2213	.0292	.0292	.0292
16	-.2363	-.2360	-.2357	.0333	.0332	.0332
17	-.2507	-.2504	-.2501	.0375	.0375	.0374
18	-.2651	-.2648	-.2644	.0421	.0420	.0419
19	-.2795	-.2791	-.2787	.0469	.0468	.0467
20	-.2938	-.2933	-.2929	.0520	.0518	.0518
21	-.3080	-.3075	-.3071	.0573	.0571	.0570
22	-.3222	-.3217	-.3211	.0629	.0627	.0626
23	-.3363	-.3357	-.3351	.0687	.0685	.0684
24	-.3503	-.3497	-.3491	.0748	.0746	.0745
25	-.3643	-.3636	-.3630	.0812	.0810	.0808
26	-.3782	-.3775	-.3767	.0878	.0876	.0874
27	-.3920	-.3912	-.3905	.0947	.0944	.0942
28	-.4058	-.4049	-.4041	.1018	.1016	.1013
29	-.4194	-.4185	-.4177	.1093	.1089	.1087
30	-.4330	-.4321	-.4311	.1170	.1166	.1163
31	-.4465	-.4455	-.4445	.1249	.1245	.1242
32	-.4599	-.4589	-.4578	.1331	.1327	.1323
33	-.4733	-.4722	-.4710	.1416	.1412	.1407
34	-.4865	-.4854	-.4842	.1504	.1499	.1494
35	-.4997	-.4984	-.4972	.1595	.1589	.1584
36	-.5128	-.5115	-.5101	.1688	.1682	.1676
37	-.5257	-.5244	-.5230	.1784	.1777	.1771
38	-.5386	-.5372	-.5357	.1883	.1876	.1869
39	-.5514	-.5499	-.5484	.1984	.1977	.1970
40	-.5641	-.5625	-.5609	.2089	.2081	.2073
41	-.5767	-.5750	-.5734	.2197	.2188	.2179
42	-.5892	-.5875	-.5857	.2307	.2298	.2289
43	-.6016	-.5998	-.5980	.2421	.2411	.2401
44	-.6139	-.6120	-.6101	.2537	.2527	.2516

180°-φ°	τ			σ		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
45	1.3039	1.2956	1.2873	.6961	.6958	.6935
46	1.3180	1.3095	1.3010	.7154	.7129	.7105
47	1.3326	1.3238	1.3151	.7327	.7302	.7276
48	1.3476	1.3385	1.3295	.7503	.7476	.7449
49	1.3629	2.3535	1.3442	.7680	.7652	.7624
50	1.3786	1.3690	1.3594	.7858	.7829	.7800
51	1.3948	1.3848	1.3749	.8039	.8009	.7979
52	1.4113	1.4010	1.3909	.8222	.8190	.8159
53	1.4283	1.4177	1.4072	.8406	.8374	.8341
54	1.4456	1.4348	1.4240	.8593	.8559	.8525
55	1.4635	1.4523	1.4412	?82	.8747	.8711
56	1.4817	1.4702	1.4588	?74	.8937	.8900
57	1.5005	1.4886	1.4768	68	.9129	.9091
58	1.5197	1.5075	1.4954	65	.9324	.9284
59	1.5394	1.5268	1.5144	964	.9523	.9480
60	1.5596	1.5467	1.5338	.9767	.9723	.9679
61	1.5803	1.5670	1.5538	.9972	.9927	.9882
62	1.6015	1.5878	1.5743	1.0181	1.0134	1.0087
63	1.6233	1.6092	1.5953	1.0393	1.0344	1.0295
64	1.6457	1.6312	1.6168	1.0609	1.0558	1.0507
65	1.6686	1.6537	1.6389	1.0828	1.0775	1.0722
66	1.6922	1.6768	1.6616	1.1051	1.0996	1.0942
67	1.7164	1.7006	1.6849	1.1279	1.1222	1.1165
68	1.7412	1.7249	1.7088	1.1511	1.1452	1.1393
69	1.7667	1.7490	1.7334	1.1747	1.1686	1.1625
70	1.7929	1.7757	1.7586	1.1989	1.1925	1.1862
71	1.8199	1.8021	1.7846	1.2235	1.2169	1.2103
72	1.8475	1.8293	1.8112	1.2487	1.2418	1.2350
73	1.8760	1.8572	1.8386	1.2745	1.2674	1.2603
74	1.9053	1.8860	1.8668	1.3008	1.2935	1.2861
75	1.9355	1.9156	1.8959	1.3278	1.3202	1.3126
76	1.9666	1.9461	1.9258	1.3555	1.3476	1.3397
77	1.9986	1.9775	1.9566	1.3839	1.3757	1.3675
78	2.0316	2.0098	1.9883	1.4131	1.4045	1.3960
79	2.0657	2.0432	2.0210	1.4430	1.4341	1.4253
80	2.1008	2.0777	2.0548	1.4738	1.4646	1.4555
81	2.1371	2.1132	2.0896	1.5055	1.4960	1.4865
82	2.1746	2.1500	2.1257	1.5382	1.5283	1.5185
83	2.2133	2.1880	2.1629	1.5720	1.5617	1.5514
84	2.2535	2.2273	2.2014	1.6068	1.5961	1.5854
85	2.2950	2.2680	2.2413	1.6428	1.6316	1.6206
86	2.3381	2.3102	2.2826	1.6800	1.6684	1.6569
87	2.3827	2.3539	2.3255	1.7186	1.7066	1.6946
88	2.4291	2.3993	2.3699	1.7586	1.7461	1.7337
89	2.4773	2.4465	2.4162	1.8002	1.7872	1.7742
90	2.5275	2.4956	2.4642	1.8434	1.8299	1.8164

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$180° - \phi^a$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
45	-.6261	-.6241	-.6221	.2657	.2645	.2634
46	-.6381	-.6361	-.6340	.2780	.2768	.2755
47	-.6501	-.6480	-.6459	.2906	.2893	.2880
48	-.6619	-.6597	-.6575	.3035	.3021	.3007
49	-.6737	-.6714	-.6691	.3168	.3153	.3138
50	-.6853	-.6829	-.6806	.3304	.3288	.3272
51	-.6968	-.6943	-.6919	.3443	.3426	.3410
52	-.7081	-.7056	-.7031	.3586	.3568	.3550
53	-.7194	-.7168	-.7142	.3733	.3714	.3695
54	-.7305	-.7278	-.7251	.3883	.3863	.3843
55	-.7415	-.7387	-.7359	.4037	.4016	.3995
56	-.7523	-.7495	-.7466	.4195	.4172	.4150
57	-.7630	-.7601	-.7572	.4356	.4333	.4309
58	-.7736	-.7706	-.7676	.4522	.4497	.4473
59	-.7840	-.7809	-.7778	.4692	.4666	.4640
60	-.7943	-.7911	-.7879	.4867	.4839	.4811
61	-.8044	-.8011	-.7979	.5046	.5016	.4987
62	-.8144	-.8110	-.8077	.5229	.5198	.5168
63	-.8242	-.8207	-.8173	.5417	.5385	.5352
64	-.8338	-.8303	-.8267	.5610	.5576	.5542
65	-.8432	-.8396	-.8360	.5808	.5772	.5737
66	-.8525	-.8488	-.8451	.6011	.5974	.5936
67	-.8616	-.8578	-.8540	.6220	.6180	.6141
68	-.8704	-.8666	-.8627	.6434	.6393	.6351
69	-.8791	-.8752	-.8712	.6654	.6611	.6567
70	-.8876	-.8835	-.8795	.6880	.6834	.6789
71	-.8958	-.8917	-.8876	.7113	.7065	.7017
72	-.9038	-.8996	-.8954	.7352	.7301	.7251
73	-.9115	-.9073	-.9030	.7597	.7544	.7492
74	-.9190	-.9147	-.9104	.7850	.7795	.7740
75	-.9262	-.9218	-.9174	.8110	.8052	.7995
76	-.9332	-.9287	-.9242	.8378	.8317	.8257
77	-.9398	-.9352	-.9307	.8654	.8591	.8527
78	-.9461	-.9415	-.9369	.8939	.8872	.8806
79	-.9521	-.9474	-.9427	.9233	.9163	.9093
80	-.9577	-.9529	-.9482	.9535	.9462	.9390
81	-.9629	-.9581	-.9533	.9848	.9772	.9696
82	-.9677	-.9629	-.9580	1.0172	1.0091	1.0012
83	-.9721	-.9672	-.9623	1.0506	1.0422	1.0338
84	-.9761	-.9711	-.9662	1.0852	1.0764	1.0676
85	-.9795	-.9745	-.9696	1.1210	1.1118	1.1026
86	-.9824	-.9774	-.9724	1.1581	1.1485	1.1389
87	-.9848	-.9798	-.9747	1.1966	1.1865	1.1765
88	-.9865	-.9815	-.9764	1.2366	1.2260	1.2155
89	-.9876	-.9826	-.9775	1.2782	1.2671	1.2560
90	-.9880	-.9829	-.9778	1.3214	1.3098	1.2982

$$\phi_c = 60°$$

180°-φ°	τ			σ		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
0	1.0000	1.0000	1.0000	.0000	.0000	.0000
1	1.0000	.9999	.9998	.0116	.0116	.0116
2	1.0004	1.0001	.9999	.0233	.0233	.0233
3	1.0010	1.0007	1.0003	.0349	.0349	.0349
4	1.0020	1.0015	1.0010	.0466	.0465	.0465
5	1.0032	1.0026	1.0021	.0582	.0582	.0582
6	1.0048	1.0041	1.0034	.0699	.0698	.0698
7	1.0067	1.0058	1.0050	.0816	.0815	.0815
8	1.0088	1.0079	1.0070	.0932	.0932	.0932
9	1.0113	1.0102	1.0092	.1050	.1049	.1048
10	1.0141	1.0129	1.0117	.1167	.1166	.1166
11	1.0172	1.0159	1.0146	.1284	.1284	.1283
12	1.0206	1.0192	1.0178	.1402	.1401	.1400
13	1.0343	1.0228	1.0212	.1520	.1519	.1518
14	1.0283	1.0267	1.0250	.1639	1637	.1636
15	1.0327	1.0309	1.0291	.1757	.1756	.1754
16	1.0373	1.0354	1.0335	.1876	.1875	.1873
17	1.0423	1.0402	1.0382	.1996	.1994	.1992
18	1.0476	1.0454	1.0432	.2116	.2114	.2111
19	1.0532	1.0509	1.0486	.2236	.2234	.2231
20	1.0591	1.0567	1.0542	.2357	.2354	.2352
21	1.0654	1.0628	1.0602	.2478	.2475	.2472
22	1.0720	1.0692	1.0665	.2600	.2597	.2594
23	1.0789	1.0760	1.0732	.2723	.2719	.2715
24	1.0861	1.0831	1.0801	.2846	.2842	.2838
25	1.0937	1.0905	1.0874	.2970	.2965	.2961
26	1.1016	1.0983	1.0950	.3094	.3089	.3085
27	1.1096	1.1064	1.1030	.3219	.3214	.3209
28	1.1184	1.1149	1.1113	.3345	.3340	.3334
29	1.1274	1.1236	1.1199	.3472	.3466	.3460
30	1.1367	1.1328	1.1289	.3600	.3593	.3587
31	1.1464	1.1423	1.1382	.3728	.3721	.3715
32	1.1564	1.1521	1.1479	.3858	.3850	.3843
33	1.1668	1.1623	1.1580	.3988	.3980	.3973
34	1.1775	1.1729	1.1684	.4120	.4111	.4103
35	1.1886	1.1839	1.1792	.4252	.4244	.4235
36	1.2002	1.1952	1.1903	.4386	.4377	.4368
37	1.2121	1.2070	1.2019	.4521	.4511	.4501
38	1.2244	1.2191	1.2138	.4657	.4647	.4637
39	1.2371	1.2316	1.2261	.4795	.4784	.4773
40	1.2502	1.2445	1.2388	.4934	.4922	.4911
41	1.2637	1.2578	1.2520	.5074	.5062	.5050
42	1.2777	1.2716	1.2655	.5216	.5203	.5190
43	1.2921	1.2858	1.2795	.5360	.5346	.5332
44	1.3070	1.3004	1.2939	.5505	.5491	.5476

$180° - \phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
0	.0000	.0000	.0000	.0000	.0000	.0000
1	-.0116	-.0116	-.0116	.0001	.0001	.0001
2	-.0233	-.0233	-.0233	.0004	.0004	.0004
3	-.0349	-.0349	-.0349	.0009	.0009	.0009
4	-.0465	-.0465	-.0465	.0016	.0016	.0016
5	-.0581	-.0581	-.0581	.0025	.0025	.0025
6	-.0697	-.0697	-.0697	.0037	.0037	.0037
7	-.0814	-.0813	-.0813	.0050	.0050	.0050
8	-.0929	-.0929	-.0929	.0065	.0065	.0065
9	-.1045	-.1045	-.1044	.0082	.0082	.0082
10	-.1161	-.1160	-.1160	.0102	.0102	.0102
11	-.1276	-.1276	-.1275	.0123	.0123	.0123
12	-.1392	-.1391	-.1390	.0147	.0147	.0146
13	-.1507	-.1506	-.1505	.0172	.0172	.0172
14	-.1622	-.1621	-.1620	.0200	.0200	.0199
15	-.1737	-.1736	-.1734	.0230	.0229	.0229
16	-.1852	-.1850	-.1849	.0261	.0261	.0261
17	-.1967	-.1965	-.1963	.0295	.0295	.0295
18	-.2081	-.2079	-.2077	.0331	.0331	.0330
19	-.2195	-.2193	-.2190	.0370	.0369	.0368
20	-.2309	-.2306	-.2304	.0410	.0409	.0409
21	-.2423	-.2420	-.2417	.0452	.0452	.0451
22	-.2536	-.2533	-.2530	.0497	.0496	.0495
23	-.2649	-.2646	-.2642	.0544	.0543	.0542
24	-.2762	-.2758	-.2754	.0593	.0592	.0591
25	-.2875	-.2871	-.2866	.0644	.0643	.0642
26	-.2987	-.2983	-.2978	.0698	.0697	.0695
27	-.3099	-.3094	-.3089	.0754	.0752	.0751
28	-.3211	-.3206	-.3201	.0812	.0810	.0808
29	-.3322	-.3317	-.3311	.0872	.0870	.0869
30	-.3433	-.3427	-.3422	.0935	.0933	.0931
31	-.3544	-.3538	-.3532	.1001	.0998	.0996
32	-.3654	-.3648	-.3641	.1068	.1066	.1063
33	-.3765	-.3757	-.3750	.1138	.1135	.1133
34	-.3874	-.3867	-.3859	.1211	.1208	.1205
35	-.3983	-.3975	-.3968	.1286	.1282	.1279
36	-.4092	-.4084	-.4076	.1364	.1360	.1356
37	-.4201	-.4192	-.4183	.1444	.1440	.1436
38	-.4309	-.4300	-.4290	.1527	.1522	.1518
39	-.4417	-.4407	-.4397	.1613	.1608	.1603
40	-.4524	-.4514	-.4503	.1701	.1696	.1690
41	-.4631	-.4620	-.4609	.1792	.1786	.1781
42	-.4737	-.4726	-.4714	.1886	.1880	.1874
43	-.4843	-.4831	-.4819	.1983	.1976	.1970
44	-.4948	-.4936	-.4924	.2083	.2076	.2069

$180° - \phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
45	1.3223	1.3155	1.3088	.5652	.5637	.5622
46	1.3380	1.3310	1.3241	.5801	.5785	.5769
47	1.3543	1.3471	1.3399	.5951	.5935	.5918
48	1.3710	1.3636	1.3561	.6104	.6087	.6069
49	1.3883	1.3805	1.3729	.6259	.6241	.6222
50	1.4060	1.3981	1.3901	.6416	.6397	.6378
51	1.4243	1.4161	1.4079	.6575	.6555	.6535
52	1.4432	1.4346	1.4262	.6737	.6716	.6695
53	1.4626	1.4538	1.4450	.6902	.6880	.6858
54	1.4825	1.4735	1.4644	.7069	.7046	.7023
55	1.5031	1.4937	1.4844	.7239	.7214	.7190
56	1.5243	1.5146	1.5050	.7411	.7386	.7361
57	1.5461	1.5361	1.5262	.7587	.7561	.7535
58	1.5686	1.5583	1.5480	.7766	.7739	.7712
59	1.5918	1.5811	1.5705	.7949	.7920	.7892
60	1.6156	1.6046	1.5937	.8135	.8105	.8075
61	1.6402	1.6289	1.6176	.8325	.8294	.8263
62	1.6656	1.6539	1.6422	.8519	.8486	.8454
63	1.6918	1.6796	1.6676	.8717	.8683	.8649
64	1.7187	1.7062	1.6938	.8919	.8884	.8849
65	1.7466	1.7336	1.7208	.9126	.9089	.9053
66	1.7753	1.7619	1.7487	.9338	.9300	.9261
67	1.8049	1.7911	1.7775	.9555	.9515	.9475
68	1.8355	1.8213	1.8072	.9778	.9736	.9694
69	1.8672	1.8525	1.8379	1.0006	.9963	.9919
70	1.8999	1.8847	1.8696	1.0241	1.0195	1.0150
71	1.9337	1.9180	1.9024	1.0481	1.0434	1.0387
72	1.9686	1.9524	1.9363	1.0729	1.0680	1.0630
73	2.0048	1.9880	1.9714	1.0984	1.0932	1.0881
74	2.0423	2.0250	2.0077	1.1246	1.1193	1.1139
75	2.0812	2.0632	2.0454	1.1517	1.1461	1.1405
76	2.1215	2.1029	2.0844	1.1796	1.1738	1.1679
77	2.1633	2.1440	2.1249	1.2085	1.2024	1.1963
78	2.2067	2.1867	2.1670	1.2383	1.2320	1.2256
79	2.2518	2.2311	2.2107	1.2692	1.2626	1.2559
80	2.2987	2.2773	2.2561	1.3013	1.2943	1.2874
81	2.3475	2.3253	2.3033	1.3345	1.3272	1.3200
82	2.3984	2.3754	2.3526	1.3690	1.3614	1.3538
83	2.4514	2.4275	2.4039	1.4049	1.3970	1.3891
84	2.5068	2.4820	2.4574	1.4423	1.4340	1.4257
85	2.5646	2.5389	2.5134	1.4813	1.4726	1.4640
86	2.6252	2.5984	2.5719	1.5221	1.5129	1.5039
87	2.6885	2.6607	2.6331	1.5647	1.5551	1.5456
88	2.7550	2.7260	2.6974	1.6093	1.5993	1.5894
89	2.8249	2.7947	2.7648	1.6562	1.6457	1.6353
90	2.8983	2.8669	2.8357	1.7055	1.6945	1.6835

$180°-\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
45	-.5053	-.5040	-.5027	.2186	.2178	.2171
46	-.5157	-.5144	-.5131	.2292	2284	.2276
47	-.5261	-.5247	-.5233	.2402	.2393	.2384
48	-.5364	-.5350	-.5335	.2514	.2505	.2496
49	-.5467	-.5452	-.5437	.2630	.2620	.2610
50	-.5569	-.5553	-.5538	.2750	.2739	.2728
51	-.5670	-.5654	-.5638	.2873	.2861	.2850
52	-.5771	-.5754	-.5737	.2999	.2987	.2975
53	-.5871	-.5853	-.5836	.3130	.3117	.3104
54	-.5970	-.5952	-.5934	.3264	.3250	.3237
55	-.6069	-.6050	-.6032	.3402	.3388	.3373
56	-.6167	-.6148	-.6129	.3545	.3529	.3514
57	-.6264	-.6244	-.6224	.3691	.3675	.3659
58	-.6360	-.6340	-.6319	.3842	.3825	.3808
59	-.6455	-.6434	-.6413	.3998	.3980	.3961
60	-.6550	-.6528	-.6507	.4158	.4139	.4120
61	-.6643	-.6621	-.6599	.4324	.4303	.4283
62	-.6736	-.6713	-.6690	.4494	.4472	.4451
63	-.6827	-.6804	-.6780	.4670	.4647	.4624
64	-.6918	-.6893	-.6869	.4851	.4827	.4802
65	-.7007	-.6982	-.6957	.5038	.5012	.4986
66	-.7095	-.7069	-.7044	.5231	.5204	.5176
67	-.7181	-.7155	-.7129	.5430	.5401	.5373
68	-.7266	-.7239	-.7213	.5635	.5605	.5575
69	-.7350	-.7322	-.7295	.5848	.5816	.5784
70	-.7432	-.7404	-.7376	.6067	.6034	.6000
71	-.7513	-.7484	-.7455	.6294	.6259	.6223
72	-.7591	-.7562	-.7532	.6529	.6492	.6454
73	-.7668	-.7637	-.7608	.6772	.6733	.6693
74	-.7742	-.7711	-.7681	.7024	.6982	.6941
75	-.7815	-.7783	-.7752	.7285	.7241	.7197
76	-.7884	-.7852	-.7821	.7555	.7509	.7463
77	-.7952	-.7919	-.7887	.7836	.7787	.7739
78	-.8016	-.7983	-.7950	.8127	.8076	.8025
79	-.8078	-.8044	-.8011	.8430	.8376	.8322
80	-.8136	-.8102	-.8068	.8745	.8688	.8631
81	-.8191	-.8156	-.8122	.9072	.9012	.8953
82	-.8242	-.8207	-.8172	.9414	.9351	.9288
83	-.8289	-.8253	-.8218	.9770	.9703	.9637
84	-.8331	-.8295	-.8259	1.0141	1.0071	1.0001
85	-.8369	-.8332	-.8296	1.0530	1.0455	1.0382
86	-.8401	-.8364	-.8327	1.0936	1.0858	1.0780
87	-.8427	-.8389	-.8353	1.1361	1.1279	1.1196
88	-.8446	-.8409	-.8372	1.1808	1.1720	1.1633
89	-.8458	-.8421	-.8384	1.2276	1.2184	1.2092
90	-.8463	-.8425	-.8388	1.2769	1.2672	1.2575

180°-𝜙°	τ			σ		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
0	1.0000	1.0000	1.0000	.0000	.0000	.0000
1	1.0001	1.0000	.9999	.0090	.0090	.0090
2	1.0004	1.0003	1.0001	.0180	.0180	.0180
3	1.0011	1.0008	1.0006	.0269	.0269	.0269
4	1.0022	1.0017	1.0014	.0359	.0359	.0359
5	1.0034	1.0029	1.0025	.0449	.0449	.0449
6	1.0050	1.0044	1.0039	.0540	.0539	.0539
7	1.0068	1.0062	1.0056	.0630	.0630	.0629
8	1.0091	1.0083	1.0076	.0720	.0720	.0720
9	1.0116	1.0108	1.0099	.0811	.0811	.0810
10	1.0144	1.0135	1.0126	.0902	.0902	.0901
11	1.0175	1.0165	1.0155	.0993	.0993	.0992
12	1.0210	1.0199	1.0188	.1085	.1084	.1084
13	1.0248	1.0236	1.0224	.1177	.1176	.1175
14	1.0288	1.0276	1.0263	.1269	.1268	.1267
15	1.0333	1.0319	1.0305	.1361	.1360	.1359
16	1.0380	1.0365	1.0350	.1454	.1453	.1452
17	1.0431	1.0415	1.0399	.1548	.1547	.1545
18	1.0484	1.0468	1.0451	.1641	.1640	.1639
19	1.0542	1.0524	1.0506	.1736	.1735	.1733
20	1.0602	1.0583	1.0564	.1831	.1829	.1828
21	1.0666	1.0646	1.0626	.1926	.1925	.1923
22	1.0734	1.0713	1.0692	.2022	.2021	.2018
23	1.0805	1.0783	1.0760	.2119	.2117	.2115
24	1.0880	1.0856	1.0833	.2217	.2214	.2212
25	1.0958	1.0933	1.0909	.2315	.2312	.2310
26	1.1040	1.1014	1.0988	.2414	.2411	.2408
27	1.1125	1.1098	1.1071	.2514	.2511	.2507
28	1.1214	1.1186	1.1158	.2614	.2611	.2608
29	1.1308	1.1278	1.1249	.2716	.2712	.2709
30	1.1405	1.1374	1.1343	.2818	.2815	.2811
31	1.1506	1.1474	1.1442	.2922	.2918	.2913
32	1.1611	1.1577	1.1544	.3026	.3022	.3017
33	1.1720	1.1685	1.1651	.3132	.3127	.3122
34	1.1833	1.1797	1.1761	.3239	.3234	.3228
35	1.1951	1.1914	1.1876	.3347	.3341	.3336
36	1.2073	1.2034	1.1995	.3456	.3450	.3444
37	1.2200	1.2159	1.2119	.3566	.3560	.3554
38	1.2331	1.2289	1.2247	.3678	.3672	.3665
39	1.2467	1.2424	1.2380	.3792	.3785	.3778
40	1.2608	1.2563	1.2518	.3907	.3899	.3892
41	1.2754	1.2707	1.2660	.4023	.4016	.4008
42	1.2905	1.2856	1.2808	.4141	.4133	.4125
43	1.3062	1.3011	1.2961	.4261	.4253	.4244
44	1.3223	1.3171	1.3119	.4383	.4374	.4365

$180°-\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
.0	.0000	.0000	.0000	.0000	.0000	.0000
1	-.0090	.0090	-.0090	.0001	.0001	.0001
2	-.0180	-.0180	-.0180	.0003	.0003	.0003
3	-.0269	-.0269	-.0269	.0007	.0007	.0007
4	-.0359	-.0359	-.0359	.0013	.0013	.0013
5	-.0449	-.0449	-.0449	.0020	.0020	.0020
6	-.0539	-.0538	-.0538	.0028	.0028	.0028
7	-.0628	-.0628	-.0628	.0038	.0038	.0038
8	-.0718	-.0718	-.0718	.0050	.0050	.0050
9	-.0808	-.0807	-.0807	.0064	.0064	.0064
10	-.0897	-.0897	-.0897	.0079	.0079	.0079
11	-.0987	-.0987	-.0986	.0095	.0095	.0095
12	-.1077	-.1076	-.1076	.0114	.0113	.0113
13	-.1166	-.1166	-.1165	.0133	.0133	.0133
14	-.1256	-.1255	-.1254	.0155	.0155	.0155
15	-.1346	-.1345	-.1344	.0178	.0178	.0178
16	-.1435	-.1434	-.1433	.0203	.0203	.0203
17	-.1525	-.1524	-.1522	.0229	.0229	.0229
18	-.1614	-.1613	-.1612	.0258	.0257	.0257
19	-.1704	-.1702	-.1701	.0288	.0287	.0287
20	-.1793	-.1792	-.1790	.0319	.0319	.0319
21	-.1883	-.1881	-.1879	.0353	.0352	.0352
22	-.1972	-.1970	-.1968	.0388	.0388	.0387
23	-.2062	-.2059	-.2057	.0425	.0424	.0424
24	-.2151	-.2149	-.2146	.0464	.0463	.0463
25	-.2240	-.2238	-.2235	.0505	.0504	.0503
26	-.2330	-.2327	-.2324	.0547	.0546	.0546
27	-.2419	-.2416	-.2413	.0592	.0591	.0590
28	-.2508	-.2505	-.2502	.0638	.0637	.0636
29	-.2598	-.2594	-.2591	.0687	.0686	.0684
30	-.2687	-.2683	-.2679	.0737	.0736	.0735
31	-.2776	-.2772	-.2768	.0790	.0788	.0787
32	-.2865	-.2861	-.2857	.0844	.0843	.0841
33	-.2954	-.2950	-.2945	.0901	.0899	.0898
34	-.3043	-.3038	-.3034	.0960	.0958	.0956
35	-.3132	-.3127	-.3122	.1021	.1019	.1017
36	-.3221	-.3216	-.3210	.1085	.1082	.1080
37	-.3310	-.3304	-.3299	.1150	.1148	.1145
38	-.3399	-.3393	-.3387	.1218	.1216	.1213
39	-.3487	-.3481	-.3475	.1289	.1286	.1283
40	-.3576	-.3569	-.3563	.1362	.1359	.1356
41	-.3665	-.3658	-.3651	.1438	.1434	.1431
42	-.3753	-.3746	-.3739	.1516	.1512	.1508
43	-.3842	-.3834	-.3827	.1597	.1593	.1589
44	-.3930	-.3922	-.3914	.1681	.1676	.1672

$180° - \phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
45	1.3390	1.3336	1.3282	.4507	.4497	.4487
46	1.3563	1.3507	1.3451	.4632	.4622	.4612
47	1.3742	1.3684	1.3626	.4760	.4750	.4739
48	1.3927	1.3867	1.3807	.4890	.4879	.4868
49	1.4119	1.4056	1.3994	.5023	.5011	.4999
50	1.4317	1.4252	1.4187	.5157	.5145	.5133
51	1.4521	1.4454	1.4388	.5295	.5282	.5269
52	1.4733	1.4664	1.4594	.5435	.5421	.5408
53	1.4952	1.4880	1.4809	.5578	.5564	.5549
54	1.5179	1.5104	1.5030	.5724	.5709	.5694
55	1.5413	1.5336	1.5259	.5873	.5857	.5841
56	1.5655	1.5575	1.5496	.6025	.6009	.5992
57	1.5906	1.5823	1.5741	.6181	.6164	.6146
58	1.6166	1.6080	1.5995	.6340	.6322	.6304
59	1.6435	1.6346	1.6258	.6504	.6485	.6465
60	1.6713	1.6621	1.6530	.6671	.6651	.6631
61	1.7002	1.6907	1.6812	.6842	.6822	.6801
62	1.7301	1.7202	1.7104	.7019	.6997	.6975
63	1.7611	1.7509	1.7407	.7199	.7177	.7153
64	1.7933	1.7827	1.7721	.7385	.7361	.7337
65	1.8266	1.8156	1.8047	.7577	.7552	.7526
66	1.8613	1.8499	1.8385	.7774	.7747	.7721
67	1.8972	1.8854	1.8737	.7977	.7949	.7921
68	1.9346	1.9224	1.9102	.8186	.8157	.8128
69	1.9735	1.9608	1.9481	.8402	.8372	.8341
70	2.0139	2.0007	1.9876	.8625	.8594	.8562
71	2.0560	2.0423	2.0287	.8856	.8823	.8790
72	2.0999	2.0856	2.0715	.9096	.9061	.9026
73	2.1456	2.1308	2.1161	.9344	.9307	.9270
74	2.1933	2.1779	2.1626	.9601	.9563	.9524
75	2.2431	2.2271	2.2112	.9868	.9828	.9788
76	2.2951	2.2785	2.2619	1.0146	1.0104	1.0062
77	2.3496	2.3323	2.3150	1.0436	1.0392	1.0347
78	2.4066	2.3886	2.3706	1.0738	1.0692	1.0645
79	2.4664	2.4476	2.4289	1.1054	1.1005	1.0956
80	2.5291	2.5095	2.4900	1.1384	1.1332	1.1281
81	2.5951	2.5746	2.5542	1.1729	1.1675	1.1621
82	2.6644	2.6430	2.6217	1.2092	1.2035	1.1978
83	2.7375	2.7151	2.6929	1.2473	1.2413	1.2353
84	2.8146	2.7912	2.7679	1.2875	1.2811	1.2748
85	2.8961	2.8716	2.8472	1.3298	1.3231	1.3164
86	2.9823	2.9566	2.9311	1.3746	1.3675	1.3604
87	3.0738	3.0468	3.0201	1.4220	1.4145	1.4070
88	3.1711	3.1427	3.1146	1.4723	1.4643	1.4564
89	3.2746	3.2448	3.2152	1.5258	1.5174	1.5090
90	3.3851	3.3537	3.3226	1.5830	1.5740	1.5651

$180°-\phi°$	ξ			η		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
45	- .4018	- .4010	- .4002	.1768	.1763	.1758
46	- .4136	- .4098	- .4089	.1857	.1852	.1847
47	- .4194	- .4185	- .4177	.1950	.1944	.1939
48	- .4282	- .4273	- .4264	.2046	.2040	.2034
49	- .4370	- .4360	- .4351	.2145	.2139	.2132
50	- .4457	- .4447	- .4437	.2248	.2241	.2234
51	- .4545	- .4534	- .4524	.2354	.2346	.2339
52	- .4632	- .4621	- .4610	.2463	.2455	.2447
53	- .4719	- .4708	- .4696	.2577	.2568	.2560
54	- .4806	- .4794	- .4782	.2694	.2685	.2676
55	- .4892	- .4880	- .4868	.2815	.2806	.2796
56	- .4978	- .4966	- .4953	.2941	.2930	.2920
57	- .5064	- .5051	- .5039	.3071	.3060	.3049
58	- .5150	- .5137	- .5123	.3205	.3193	.3182
59	- .5235	- .5221	- .5208	.3344	.3332	.3320
60	- .5320	- .5306	- .5292	.3489	.3475	.3462
61	- .5405	- .5390	- .5375	.3638	.3624	.3610
62	- .5489	- .5473	- .5458	.3793	.3778	.3763
63	- .5572	- .5556	- .5541	.3953	.3937	.3922
64	- .5655	- .5639	- .5623	.4119	.4103	.4086
65	- .5738	- .5721	- .5704	.4292	.4274	.4257
66	- .5819	- .5802	- .5785	.4471	.4452	.4434
67	- .5900	- .5882	- .5865	.4657	.4637	.4618
68	- .5980	- .5962	- .5944	.4851	.4830	.4809
69	- .6060	- .6041	- .6022	.5052	.5029	.5007
70	- .6138	- .6118	- .6099	.5261	.5237	.5214
71	- .6215	- .6195	- .6175	.5479	.5454	.5428
72	- .6291	- .6270	- .6250	.5706	.5679	.5652
73	- .6365	- .6344	- .6324	.5942	.5914	.5886
74	- .6438	- .6417	- .6396	.6189	.6159	.6129
75	- .6510	- .6488	- .6466	.6447	.6415	.6383
76	- .6579	- .6557	- .6535	.6716	.6682	.6648
77	- .6647	- .6624	- .6602	.6998	.6962	.6926
78	- .6712	- .6689	- .6666	.7293	.7254	.7216
79	- .6775	- .6751	- .6728	.7602	.7561	.7521
80	- .6835	- .6811	- .6787	.7926	.7883	.7840
81	- .6892	- .6868	- .6843	.8267	.8221	.8176
82	- .6946	- .6921	- .6896	.8626	.8577	.8529
83	- .6996	- .6970	- .6945	.9004	.8952	.8901
84	- .7041	- .7015	- .6990	.9403	.9348	.9293
85	- .7082	- .7055	- .7029	.9824	.9766	.9708
86	- .7117	- .7090	- .7064	1.0270	1.0208	1.0146
87	- .7146	- .7119	- .7092	1.0743	1.0677	1.0611
88	- .7168	- .7140	- .7114	1.1246	1.1175	1.1105
89	- .7181	- .7154	- .7128	1.1782	1.1706	1.1631
90	- .7187	- .7159	- .7132	1.2353	1.2272	1.2192

$180°-\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
0	1.0000	1.0000	1.0000	.0000	.0000	.0000
1	1.0001	1.0000	.9999	.0068	.0068	.0068
2	1.0005	1.0003	1.0002	.0135	.0135	.0135
3	1.0012	1.0010	1.0008	.0203	.0203	.0203
4	1.0022	1.0019	1.0016	.0271	.0271	.0271
5	1.0035	1.0031	1.0028	.0339	.0338	.0338
6	1.0051	1.0047	1.0043	.0406	.0406	.0406
7	1.0070	1.0065	1.0061	.0475	.0474	.0474
8	1.0092	1.0087	1.0082	.0543	.0543	.0543
9	1.0118	1.0112	1.0106	.0611	.0611	.0611
10	1.0146	1.0140	1.0133	.0680	.0680	.0680
11	1.0178	1.0171	1.0163	.0749	.0749	.0748
12	1.0213	1.0205	1.0197	.0818	.0818	.0818
13	1.0251	1.0242	1.0233	.0888	.0887	.0887
14	1.0293	1.0283	1.0273	.0958	.0957	.0957
15	1.0338	1.0327	1.0317	.1028	.1027	.1027
16	1.0386	1.0374	1.0363	.1099	.1098	.1097
17	1.0437	1.0425	1.0413	.1170	.1169	.1168
18	1.0492	1.0479	1.0466	.1241	.1240	.1240
19	1.0550	1.0536	1.0523	.1313	.1312	.1312
20	1.0612	1.0597	1.0583	.1386	.1385	.1384
21	1.0677	1.0662	1.0647	.1459	.1458	.1457
22	1.0746	1.0730	1.0714	.1533	.1531	.1530
23	1.0819	1.0802	1.0785	.1607	.1606	.1604
24	1.0895	1.0878	1.0860	.1682	.1681	.1679
25	1.0976	1.0957	1.0938	.1758	.1756	.1755
26	1.1060	1.1040	1.1021	.1834	.1832	.1831
27	1.1148	1.1128	1.1107	.1911	.1910	.1908
28	1.1240	1.1219	1.1197	.1989	.1987	.1986
29	1.1337	1.1314	1.1292	.2068	.2066	.2064
30	1.1437	1.1414	1.1391	.2148	.2146	.2144
31	1.1543	1.1518	1.1494	.2229	.2226	.2224
32	1.1652	1.1627	1.1601	.2311	.2308	.2306
33	1.1766	1.1740	1.1713	.2394	.2391	.2388
34	1.1885	1.1857	1.1830	.2478	.2475	.2472
35	1.2009	1.1980	1.1951	.2563	.2559	.2556
36	1.2137	1.2107	1.2077	.2649	.2646	.2642
37	1.2271	1.2240	1.2209	.2737	.2733	.2730
38	1.2410	1.2378	1.2345	.2826	.2822	.2818
39	1.2555	1.2521	1.2487	.2916	.2912	.2908
40	1.2705	1.2670	1.2635	.3008	.3004	.3000
41	1.2861	1.2824	1.2788	.3102	.3097	.3093
42	1.3023	1.2985	1.2947	.3197	.3192	.3187
43	1.3191	1.3151	1.3112	.3294	.3289	.3284
44	1.3365	1.3324	1.3284	.3393	.3387	.3382

$180°-\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
C	.0000	.0000	.0000	.0000	.0000	.0000
1	-.0068	-.0068	-.0068	.0001	.0001	.0001
2	-.0135	-.0135	-.0135	.0002	.0002	.0002
3	-.0203	-.0203	-.0203	.0005	.0005	.0005
4	-.0270	-.0270	-.0270	.0009	.0009	.0009
5	-.0338	-.0338	-.0338	.0015	.0015	.0015
6	-.0406	-.0406	-.0406	.0021	.0021	.0021
7	-.0473	-.0473	-.0473	.0029	.0029	.0029
8	-.0541	-.0541	-.0541	.0038	.0038	.0038
9	-.0609	-.0609	-.0608	.0048	.0048	.0048
10	-.0677	-.0676	-.0676	.0059	.0059	.0059
11	-.0744	-.0744	-.0744	.0072	.0072	.0072
12	-.0812	-.0812	-.0812	.0086	.0086	.0086
13	-.0880	-.0880	-.0879	.0101	.0101	.0101
14	-.0948	-.0948	-.0947	.0117	.0117	.0117
15	-.1016	-.1016	-.1015	.0135	.0135	.0135
16	-.1084	-.1084	-.1083	.0154	.0153	.0153
17	-.1152	-.1152	-.1151	.0174	.0174	.0174
18	-.1221	-.1220	-.1219	.0195	.0195	.0195
19	-.1289	-.1288	-.1287	.0218	.0218	.0218
20	-.1357	-.1356	-.1356	.0242	.0242	.0242
21	-.1426	-.1425	-.1424	.0268	.0268	.0268
22	-.1494	-.1493	-.1492	.0295	.0295	.0294
23	-.1563	-.1562	-.1561	.0323	.0323	.0323
24	-.1632	-.1630	-.1629	.0353	.0353	.0353
25	-.1701	-.1699	-.1698	.0385	.0384	.0384
26	-.1770	-.1768	-.1767	.0418	.0417	.0417
27	-.1839	-.1837	-.1835	.0452	.0452	.0451
28	-.1908	-.1906	-.1904	.0488	.0488	.0487
29	-.1977	-.1975	-.1974	.0526	.0525	.0524
30	-.2047	-.2045	-.2043	.0565	.0564	.0563
31	-.2116	-.2114	-.2112	.0606	.0605	.0604
32	-.2186	-.2184	-.2182	.0649	.0648	.0647
33	-.2256	-.2253	-.2251	.0693	.0692	.0691
34	-.2326	-.2323	-.2321	.0740	.0739	.0737
35	-.2396	-.2393	-.2391	.0788	.0787	.0785
36	-.2467	-.2463	-.2461	.0838	.0837	.0835
37	-.2537	-.2534	-.2531	.0890	.0889	.0887
38	-.2608	-.2604	-.2601	.0945	.0943	.0941
39	-.2679	-.2675	-.2671	.1001	.0999	.0997
40	-.2750	-.2746	-.2742	.1059	.1057	.1055
41	-.2821	-.2817	-.2813	.1120	.1118	.1116
42	-.2892	-.2888	-.2884	.1183	.1181	.1178
43	-.2963	-.2959	-.2955	.1249	.1246	.1244
44	-.3035	-.3030	-.3026	.1317	.1314	.1311

$180° - \phi$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
45	1.3546	1.3504	1.3462	.3493	.3438	.3482
46	1.3735	1.3691	1.3647	.3596	.3590	.3584
47	1.3930	1.3884	1.3838	.3701	.3694	.3688
48	1.4132	1.4085	1.4038	.3808	.3801	.3794
49	1.4343	1.4294	1.4245	.3917	.3910	.3903
50	1.4561	1.4510	1.4459	.4029	.4022	.4014
51	1.4788	1.4735	1.4683	.4144	.4136	.4128
52	1.5024	1.4969	1.4914	.4261	.4252	.4244
53	1.5269	1.5211	1.5154	.4381	.4372	.4363
54	1.5523	1.5464	1.5404	.4504	.4495	.4486
55	1.5787	1.5726	1.5664	.4630	.4621	.4611
56	1.6062	1.5998	1.5934	.4760	.4750	.4740
57	1.6348	1.6282	1.6215	.4894	.4883	.4872
58	1.6645	1.6576	1.6507	.5031	.5019	.5008
59	1.6955	1.6883	1.6812	.5172	.5160	.5148
60	1.7277	1.7203	1.7128	.5316	.5305	.5293
61	1.7613	1.7535	1.7458	.5468	.5454	.5441
62	1.7963	1.7882	1.7802	.5623	.5609	.5595
63	1.8328	1.8244	1.8160	.5783	.5768	.5753
64	1.8709	1.8621	1.8534	.5948	.5933	.5917
65	1.9106	1.9015	1.8925	.6119	.6103	.6087
66	1.9521	1.9427	1.9332	.6297	.6280	.6263
67	1.9956	1.9857	1.9759	.6481	.6463	.6445
68	2.0410	2.0307	2.0205	.6672	.6653	.6635
69	2.0886	2.0778	2.0672	.6871	.6851	.6831
70	2.1384	2.1272	2.1161	.7078	.7057	.7036
71	2.1907	2.1791	2.1674	.7294	.7272	.7250
72	2.2457	2.2335	2.2213	.7519	.7496	.7473
73	2.3034	2.2907	2.2780	.7755	.7730	.7706
74	2.3642	2.3509	2.3376	.8001	.7975	.7949
75	2.4282	2.4143	2.4004	.8260	.8232	.8205
76	2.4953	2.4811	2.4666	.8531	.8502	.8473
77	2.5671	2.5518	2.5366	.8816	.8786	.8755
78	2.6426	2.6265	2.6105	.9117	.9085	.9052
79	2.7226	2.7057	2.6889	.9435	.9400	.9366
80	2.8075	2.7897	2.7721	.9770	.9734	.9697
81	2.8978	2.8791	2.8605	1.0126	1.0087	1.0049
82	2.9939	2.9743	2.9547	1.0504	1.0463	1.0422
83	3.0966	3.0758	3.0552	1.0907	1.0863	1.0819
84	3.2065	3.1845	3.1627	1.1337	1.1290	1.1243
85	3.3243	3.3011	3.2780	1.1797	1.1747	1.1697
86	3.4510	3.4264	3.4020	1.2291	1.2238	1.2184
87	3.5876	3.5615	3.5356	1.2824	1.2766	1.2709
88	3.7354	3.7077	3.6801	1.3399	1.3337	1.3276
89	3.8959	3.8663	3.8370	1.4023	1.3957	1.3891
90	4.0708	4.0392	4.0078	1.4703	1.4632	1.4561

$180°-\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
45	−.3107	−.3102	−.3097	.1387	.1384	.1381
46	−.3179	−.3174	−.3169	.1460	.1457	.1454
47	−.3251	−.3246	−.3240	.1536	.1533	.1530
48	−.3323	−.3318	−.3312	.1615	.1612	.1608
49	−.3396	−.3390	−.3384	.1697	.1693	.1689
50	−.3468	−.3462	−.3456	.1782	.1778	.1774
51	−.3541	−.3535	−.3529	.1871	.1866	.1862
52	−.3614	−.3607	−.3601	.1962	.1958	.1953
53	−.3687	−.3680	−.3674	.2058	.2053	.2047
54	−.3761	−.3753	−.3746	.2157	.2151	.2145
55	−.3834	−.3826	−.3819	.2260	.2254	.2248
56	−.3907	−.3900	−.3892	.2367	.2360	.2354
57	−.3981	−.3973	−.3965	.2478	.2471	.2464
58	−.4055	−.4046	−.4038	.2593	.2586	.2579
59	−.4129	−.4120	−.4111	.2714	.2706	.2698
60	−.4202	−.4193	−.4185	.2839	.2831	.2822
61	−.4276	−.4267	−.4258	.2970	.2961	.2952
62	−.4350	−.4341	−.4331	.3106	.3097	.3087
63	−.4424	−.4414	−.4404	.3248	.3238	.3228
64	−.4498	−.4488	−.4478	.3396	.3385	.3374
65	−.4572	−.4561	−.4551	.3551	.3539	.3527
66	−.4645	−.4634	−.4624	.3712	.3700	.3687
67	−.4719	−.4707	−.4696	.3881	.3868	.3855
68	−.4792	−.4780	−.4769	.4058	.4044	.4030
69	−.4865	−.4853	−.4841	.4243	.4228	.4213
70	−.4937	−.4925	−.4913	.4437	.4421	.4405
71	−.5009	−.4996	−.4984	.4640	.4623	.4606
72	−.5081	−.5067	−.5055	.4854	.4836	.4817
73	−.5152	−.5138	−.5125	.5079	.5059	.5040
74	−.5222	−.5207	−.5194	.5315	.5294	.5273
75	−.5291	−.5276	−.5262	.5564	.5542	.5519
76	−.5358	−.5344	−.5329	.5827	.5803	.5779
77	−.5425	−.5410	−.5395	.6104	.6079	.6053
78	−.5490	−.5474	−.5459	.6398	.6370	.6343
79	−.5553	−.5537	−.5522	.6709	.6680	.6651
80	−.5615	−.5598	−.5582	.7039	.7008	.6977
81	−.5673	−.5656	−.5640	.7390	.7356	.7323
82	−.5729	−.5712	−.5695	.7764	.7728	.7692
83	−.5782	−.5764	−.5747	.8163	.8125	.8086
84	−.5830	−.5812	−.5795	.8590	.8549	.8507
85	−.5874	−.5856	−.5838	.9048	.9004	.8959
86	−.5913	−.5895	−.5877	.9541	.9493	.9445
87	−.5945	−.5927	−.5909	1.0072	1.0020	.9969
88	−.5971	−.5952	−.5933	1.0647	1.0591	1.0535
89	−.5987	−.5968	−.5949	1.1271	1.1210	1.1150
90	−.5993	−.5974	−.5955	1.1951	1.1885	1.1819

180°-φ	τ			σ		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
0	1.0000	1.0000	1.0000	.0000	.0000	.0000
1	1.0001	1.0001	1.0000	.0048	.0048	.0048
2	1.0005	1.0004	1.0003	.0097	.0097	.0097
3	1.0012	1.0011	1.0009	.0145	.0145	.0145
4	1.0022	1.0021	1.0019	.0194	.0194	.0194
5	1.0036	1.0033	1.0031	.0242	.0242	.0242
6	1.0052	1.0049	1.0046	.0291	.0291	.0291
7	1.0072	1.0068	1.0065	.0340	.0340	.0340
8	1.0094	1.0090	1.0086	.0389	.0389	.0389
9	1.0120	1.0115	1.0111	.0438	.0438	.0438
10	1.0149	1.0144	1.0139	.0488	.0488	.0487
11	1.0181	1.0175	1.0170	.0537	.0537	.0537
12	1.0216	1.0210	1.0204	.0587	.0587	.0587
13	1.0255	1.0248	1.0242	.0637	.0637	.0637
14	1.0297	1.0290	1.0283	.0687	.0687	.0687
15	1.0342	1.0334	1.0327	.0738	.0738	.0738
16	1.0390	1.0382	1.0374	.0789	.0789	.0789
17	1.0443	1.0434	1.0425	.0841	.0840	.0840
18	1.0498	1.0489	1.0480	.0892	.0892	.0892
19	1.0557	1.0548	1.0538	.0945	.0944	.0944
20	1.0620	1.0610	1.0599	.0997	.0997	.0996
21	1.0687	1.0676	1.0665	.1050	.1050	.1049
22	1.0757	1.0746	1.0734	.1104	.1103	.1103
23	1.0831	1.0819	1.0807	.1158	.1158	.1157
24	1.0909	1.0897	1.0884	.1213	.1212	.1212
25	1.0992	1.0978	1.0965	.1268	.1268	.1267
26	1.1078	1.1064	1.1050	.1324	.1324	.1323
27	1.1169	1.1154	1.1139	.1381	.1380	.1379
28	1.1264	1.1248	1.1233	.1438	.1437	.1436
29	1.1363	1.1347	1.1331	.1496	.1496	.1494
30	1.1467	1.1450	1.1433	.1555	.1554	.1553
31	1.1576	1.1558	1.1540	.1615	.1614	.1613
32	1.1690	1.1671	1.1652	.1676	.1675	.1673
33	1.1808	1.1789	1.1770	.1737	.1736	.1735
34	1.1932	1.1912	1.1892	.1800	.1799	.1797
35	1.2061	1.2040	1.2019	.1864	.1862	.1860
36	1.2196	1.2174	1.2152	.1928	.1927	.1925
37	1.2337	1.2314	1.2291	.1994	.1992	.1991
38	1.2483	1.2459	1.2436	.2061	.2059	.2057,
39	1.2636	1.2611	1.2586	.2130	.2127	.2125
40	1.2795	1.2769	1.2743	.2199	.2197	.2195
41	1.2960	1.2934	1.2907	.2270	.2268	.2265
42	1.3133	1.3105	1.3077	.2343	.2340	.2338
43	1.3313	1.3284	1.3255	.2417	.2414	.2411
44	1.3500	1.3470	1.3440	.2493	.2490	.2487

180°-φ°	ξ			η		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
0	.0000	.0000	.0000	.0000	.0000	.0000
1	-.0048	-.0048	-.0048	.0000	.0000	.0000
2	-.0097	-.0097	-.0097	.0002	.0002	.0002
3	-.0145	-.0145	-.0145	.0004	.0004	.0004
4	-.0194	-.0194	-.0194	.0007	.0007	.0007
5	-.0242	-.0242	-.0242	.0011	.0011	.0011
6	-.0291	-.0291	-.0291	.0015	.0015	.0015
7	-.0339	-.0339	-.0339	.0021	.0021	.0021
8	-.0388	-.0388	-.0388	.0027	.0027	.0027
9	-.0436	-.0436	-.0436	.0034	.0034	.0034
10	-.0485	-.0485	-.0485	.0043	.0043	.0043
11	-.0534	-.0534	-.0534	.0052	.0052	.0052
12	-.0583	-.0583	-.0582	.0062	.0062	.0062
13	-.0632	-.0631	-.0631	.0072	.0072	.0072
14	-.0681	-.0680	-.0680	.0084	.0084	.0084
15	-.0730	-.0729	-.0729	.0097	.0097	.0097
16	-.0779	-.0779	-.0778	.0110	.0110	.0110
17	-.0828	-.0828	-.0827	.0125	.0125	.0125
18	-.0876	-.0877	-.0877	.0141	.0141	.0141
19	-.0927	-.0927	-.0926	.0157	.0157	.0157
20	-.0977	-.0976	-.0976	.0175	.0175	.0175
21	-.1026	-.1026	-.1025	.0193	.0193	.0193
22	-.1076	-.1076	-.1075	.0213	.0213	.0213
23	-.1126	-.1126	-.1125	.0234	.0234	.0234
24	-.1177	-.1176	-.1175	.0256	.0255	.0255
25	-.1227	-.1226	-.1225	.0279	.0278	.0278
26	-.1277	-.1277	-.1276	.0303	.0302	.0302
27	-.1328	-.1327	-.1326	.0328	.0328	.0328
28	-.1379	-.1378	-.1377	.0355	.0354	.0354
29	-.1430	-.1429	-.1428	.0382	.0382	.0382
30	-.1482	-.1480	-.1479	.0411	.0411	.0411
31	-.1533	-.1532	-.1531	.0442	.0441	.0441
32	-.1585	-.1584	-.1582	.0473	.0473	.0472
33	-.1637	-.1635	-.1634	.0506	.0506	.0505
34	-.1689	-.1688	-.1686	.0541	.0540	.0540
35	-.1741	-.1740	-.1738	.0577	.0576	.0576
36	-.1794	-.1792	-.1791	.0615	.0614	.0613
37	-.1847	-.1845	-.1843	.0654	.0653	.0652
38	-.1900	-.1898	-.1896	.0695	.0694	.0693
39	-.1953	-.1952	-.1950	.0737	.0736	.0735
40	-.2007	-.2005	-.2003	.0781	.0780	.0779
41	-.2061	-.2059	-.2057	.0828	.0826	.0825
42	-.2116	-.2113	-.2111	.0876	.0874	.0873
43	-.2170	-.2168	-.2165	.0926	.0924	.0923
44	-.2225	-.2223	-.2220	.0978	.0976	.0975

74 ∮75

$180° - \phi$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
45	1.3695	1.3664	1.3632	.2570	.2567	.2564
46	1.3898	1.3865	1.3833	.2649	.2646	.2643
47	1.4110	1.4076	1.4042	.2731	.2727	.2724
48	1.4330	1.4295	1.4260	.2814	.2810	.2807
49	1.4560	1.4524	1.4487	.290^	.2896	.2892
50	1.4800	1.4762	1.4724	.2987	.2983	.2979
51	1.5050	1.5010	1.4970	.3077	.3073	.3069
52	1.5311	1.5269	1.5228	.3170	.3166	.3161
53	1.5583	1.5540	1.5497	.3266	.3261	.3256
54	1.5867	1.5822	1.5777	.3364	.3359	.3354
55	1.6163	1.6117	1.6070	.3465	.3460	.3455
56	1.6473	1.6425	1.6376	.3570	.3564	.3559
57	1.6797	1.6747	1.6696	.3678	.3672	.3666
58	1.7136	1.7083	1.7030	.3790	.3784	.3777
59	1.7491	1.7436	1.7381	.3906	.3899	.3892
60	1.7862	1.7805	1.7747	.4026	.4019	.4012
61	1.8251	1.8191	1.8131	.4150	.4143	.4135
62	1.8659	1.8597	1.8534	.4279	.4271	.4264
63	1.9088	1.9022	1.8957	.4414	.4405	.4397
64	1.9538	1.9469	1.9401	.4554	.4545	.4536
65	2.0011	1.9939	1.9868	.4699	.4690	.4681
66	2.0509	2.0434	2.0359	.4852	.4842	.4832
67	2.1033	2.0955	2.0876	.5011	.5000	.4990
68	2.1586	2.1504	2.1422	.5177	.5166	.5155
69	2.2170	2.2084	2.1998	.5352	.5340	.5328
70	2.2787	2.2697	2.2607	.5535	.5523	.5510
71	2.3441	2.3346	2.3251	.5728	.5715	.5702
72	2.4133	2.4033	2.3934	.5931	.5917	.5903
73	2.4868	2.4763	2.4659	.6146	.6131	.6116
74	2.5650	2.5540	2.5430	.6373	.6357	.6341
75	2.6483	2.6367	2.6250	.6613	.6596	.6579
76	2.7372	2.7249	2.7126	.6869	.6850	.6832
77	2.8323	2.8193	2.8063	.7141	.7121	.7102
78	2.9342	2.9204	2.9067	.7431	.7410	.7389
79	3.0436	3.0290	3.0145	.7742	.7719	.7697
80	3.1615	3.1460	3.1305	.8075	.8051	.8027
81	3.2888	3.2723	3.2558	.8434	.8408	.8383
82	3.4267	3.4091	3.3916	.8822	.8794	.8767
83	3.5765	3.5577	3.5390	.9242	.9213	.9183
84	3.7400	3.7199	3.6999	.9700	.9668	.9636
85	3.9189	3.8974	3.8759	1.0200	1.0165	1.0130
86	4.1158	4.0925	4.0694	1.0750	1.0711	1.0673
87	4.3333	4.3082	4.2833	1.1356	1.1314	1.1273
88	4.5749	4.5478	4.5208	1.2029	1.1983	1.1938
89	4.8450	4.8155	4.7862	1.2780	1.2730	1.2680
90	5.1490	5.1168	5.0847	1.3626	1.3571	1.3516

176

177

$180° - \phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
45	-.2280	-.2278	-.2275	.1032	.1030	.1029
46	-.2336	-.2333	-.2331	.1089	.1087	.1085
47	-.2392	-.2389	-.2386	.1148	.1146	.1144
48	-.2448	-.2445	-.2442	.1209	.1207	.1205
49	-.2505	-.2502	-.2499	.1273	.1271	.1269
50	-.2562	-.2559	-.2555	.1340	.1337	.1335
51	-.2619	-.2616	-.2612	.1409	.1407	.1404
52	-.2677	-.2673	-.2670	.1482	.1479	.1477
53	-.2735	-.2731	-.2728	.1558	.1555	.1552
54	-.2794	-.2790	-.2786	.1637	.1634	.1631
55	-.2852	-.2848	-.2844	.1719	.1716	.1713
56	-.2912	-.2908	-.2903	.1806	.1802	.1798
57	-.2971	-.2967	-.2962	.1896	.1892	.1888
58	-.3031	-.3027	-.3022	.1990	.1986	.1982
59	-.3092	-.3087	-.3082	.2089	.2084	.2080
60	-.3153	-.3148	-.3143	.2192	.2187	.2183
61	-.3214	-.3209	-.3204	.2300	.2295	.2290
62	-.3276	-.3270	-.3265	.2414	.2408	.2403
63	-.3338	-.3332	-.3327	.2533	.2527	.2521
64	-.3400	-.3394	-.3389	.2658	.2652	.2646
65	-.3463	-.3457	-.3451	.2790	.2783	.2776
66	-.3526	-.3520	-.3514	.2929	.2921	.2914
67	-.3590	-.3583	-.3576	.3074	.3066	.3059
68	-.3653	-.3647	-.3640	.3228	.3220	.3211
69	-.3717	-.3710	-.3703	.3391	.3382	.3373
70	-.3781	-.3774	-.3767	.3563	.3553	.3543
71	-.3846	-.3838	-.3831	.3744	.3734	.3723
72	-.3910	-.3903	-.3895	.3937	.3926	.3914
73	-.3975	-.3967	-.3959	.4142	.4129	.4117
74	-.4039	-.4031	-.4023	.4359	.4346	.4333
75	-.4103	-.4095	-.4086	.4591	.4577	.4563
76	-.4167	-.4159	-.4150	.4838	.4823	.4808
77	-.4231	-.4222	-.4212	.5103	.5086	.5070
78	-.4294	-.4284	-.4275	.5386	.5368	.5351
79	-.4355	-.4346	-.4336	.5690	.5671	.5652
80	-.4416	-.4406	-.4396	.6018	.5998	.5977
81	-.4475	-.4465	-.4455	.6372	.6350	.6328
82	-.4533	-.4522	-.4512	.6756	.6732	.6707
83	-.4588	-.4577	-.4566	.7173	.7146	.7120
84	-.4639	-.4628	-.4617	.7628	.7598	.7570
85	-.4687	-.4676	-.4664	.8125	.8094	.8062
86	-.4730	-.4719	-.4707	.8673	.8638	.8603
87	-.4767	-.4755	-.4743	.9278	.9240	.9202
88	-.4796	-.4784	-.4772	.9950	.9908	.9866
89	-.4816	-.4804	-.4792	1.0702	1.0655	1.0608
90	-.4823	-.4811	-.4799	1.1547	1.1495	1.1444

177

$$\phi_c = 80°$$

180°-φ	τ			σ		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
0	1.0000	1.0000	1.0000	.0000	.0000	.0000
1	1.0001	1.0001	1.0001	.0031	.0031	.0031
2	1.0005	1.0005	1.0004	.0063	.0063	.0063
3	1.0013	1.0012	1.0011	.0094	.0094	.0094
4	1.0023	1.0022	1.0021	.0125	.0125	.0125
5	1.0037	1.0035	1.0033	.0157	.0157	.0157
6	1.0053	1.0051	1.0049	.0188	.0188	.0188
7	1.0073	1.0071	1.0068	.0220	.0220	.0220
8	1.0096	1.0093	1.0091	.0251	.0251	.0251
9	1.0122	1.0119	1.0116	.0283	.0283	.0283
10	1.0151	1.0147	1.0144	.0315	.0315	.0315
11	1.0183	1.0180	1.0176	.0347	.0347	.0347
12	1.0219	1.0215	1.0211	.0380	.0379	.0379
13	1.0258	1.0253	1.0249	.0412	.0412	.0412
14	1.0300	1.0295	1.0291	.0445	.0445	.0445
15	1.0346	1.0341	1.0336	.0478	.0478	.0477
16	1.0395	1.0390	1.0384	.0511	.0511	.0511
17	1.0448	1.0442	1.0436	.0544	.0544	.0544
18	1.0504	1.0498	1.0492	.0578	.0578	.0578
19	1.0564	1.0558	1.0551	.0612	.0612	.0612
20	1.0628	1.0621	1.0614	.0646	.0646	.0646
21	1.0695	1.0688	1.0681	.0681	.0681	.0681
22	1.0767	1.0759	1.0752	.0716	.0716	.0716
23	1.0843	1.0835	1.0827	.0752	.0752	.0751
24	1.0922	1.0914	1.0906	.0788	.0788	.0787
25	1.1006	1.0998	1.0989	.0824	.0824	.0824
26	1.1095	1.1085	1.1076	.0861	.0861	.0861
27	1.1188	1.1178	1.1168	.0899	.0898	.0898
28	1.1285	1.1275	1.1265	.0937	.0936	.0936
29	1.1387	1.1377	1.1366	.0975	.0975	.0974
30	1.1495	1.1483	1.1472	.1014	.1014	.1013
31	1.1607	1.1595	1.1584	.1054	.1053	.1053
32	1.1724	1.1712	1.1700	.1094	.1094	.1093
33	1.1848	1.1835	1.1822	.1136	.1135	.1134
34	1.1976	1.1963	1.1950	.1177	.1177	1176
35	1.2111	1.2097	1.2083	.1220	.1219	.1219
36	1.2252	1.2237	1.2223	.1264	.1263	.1262
37	1.2399	1.2384	1.2369	.1308	.1307	.1306
38	1.2552	1.2537	1.2521	.1353	.1353	.1352
39	1.2713	1.2697	1.2680	.1400	.1399	.1398
40	1.2881	1.2864	1.2847	.1447	.1446	.1445
41	1.3056	1.3039	1.3021	.1496	1495	.1494
42	1.3240	1.3221	1.3203	.1545	.1544	.1543
43	1.3431	1.3412	1.3393	.1596	.1595	.1594
44	1.3631	1.3611	1.3591	.1648	.1647	.1646

$180°-\phi$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
0	.0000	.0000	.0000	.0000	.0000	.0000
1	-.0031	-.0031	-.0031	.0000	.0000	.0000
2	-.0063	-.0063	-.0063	.0001	.0001	.0001
3	-.0094	-.0094	-.0094	.0002	.0002	.0002
4	-.0125	-.0125	-.0125	.0004	.0004	.0004
5	-.0156	-.0156	-.0156	.0007	.0007	.0007
6	-.0188	-.0188	-.0188	.0010	.0010	.0010
7	-.0219	-.0219	-.0219	.0013	.0013	.0013
8	-.0250	-.0250	-.0250	.0018	.0018	.0018
9	-.0282	-.0282	-.0282	.0022	.0022	.0022
10	-.0313	-.0313	-.0313	.0027	.0027	.0027
11	-.0345	-.0345	-.0345	.0033	.0033	.0033
12	-.0377	-.0377	-.0377	.0040	.0040	.0040
13	-.0408	-.0408	-.0408	.0047	.0047	.0047
14	-.0440	-.0440	-.0440	.0054	.0054	.0054
15	-.0472	-.0472	-.0472	.0063	.0063	.0063
16	-.0504	-.0504	-.0504	.0072	.0072	.0072
17	-.0536	-.0536	-.0536	.0081	.0081	.0081
18	-.0568	-.0568	-.0568	.0091	.0091	.0091
19	-.0601	-.0600	-.0600	.0102	.0102	.0102
20	-.0633	-.0633	-.0633	.0113	.0113	.0113
21	-.0666	-.0665	-.0665	.0126	.0126	.0126
22	-.0698	-.0698	-.0698	.0138	.0138	.0138
23	-.0731	-.0731	-.0731	.0152	.0152	.0152
24	-.0764	-.0764	-.0764	.0166	.0166	.0166
25	-.0797	-.0797	-.0797	.0182	.0181	.0181
26	-.0831	-.0830	-.0830	.0197	.0197	.0197
27	-.0864	-.0864	-.0863	.0214	.0214	.0214
28	-.0896	-.0897	-.0897	.0232	.0232	.0231
29	-.0932	-.0931	-.0931	.0250	.0250	.0250
30	-.0966	-.0965	-.0965	.0269	.0269	.0269
31	-.1000	-.0999	-.0999	.0289	.0289	.0289
32	-.1034	-.1034	-.1033	.0311	.0310	.0310
33	-.1069	-.1068	-.1068	.0333	.0333	.0332
34	-.1104	-.1103	-.1103	.0356	.0356	.0355
35	-.1139	-.1138	-.1138	.0380	.0380	.0380
36	-.1175	-.1174	-.1173	.0405	.0405	.0405
37	-.1210	-.1210	-.1209	.0432	.0431	.0431
38	-.1246	-.1246	-.1245	.0459	.0459	.0459
39	-.1283	-.1282	-.1281	.0488	.0488	.0487
40	-.1319	-.1318	-.1317	.0518	.0518	.0517
41	-.1356	-.1355	-.1354	.0550	.0549	.0549
42	-.1393	-.1392	-.1391	.0583	.0582	.0582
43	-.1431	-.1430	-.1429	.0617	.0616	.0616
44	-.1469	-.1467	-.1466	.0653	.0653	.0652

180°-φ°	τ			σ		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
45	1.3840	1.3819	1.3799	.1702	.1701	.1699
46	1.4059	1.4037	1.4015	.1757	.1755	.1754
47	1.4288	1.4265	1.4242	.1814	.1812	.1810
48	1.4527	1.4503	1.4480	.1872	.1870	.1869
49	1.4777	1.4753	1.4728	.1932	.1930	.1928
50	1.5040	1.5014	1.4988	.1994	.1992	.1990
51	1.5314	1.5287	1.5260	.2058	.2056	.2054
52	1.5602	1.5574	1.5546	.2124	.2121	.2120
53	1.5904	1.5874	1.5845	.2192	.2189	.2187
54	1.6220	1.6189	1.6159	.2262	.2260	.2258
55	1.6552	1.6520	1.6488	.2336	.2333	.2331
56	1.6901	1.6868	1.6834	.2412	.2409	.2406
57	1.7266	1.7233	1.7198	.2490	.2488	.2485
58	1.7654	1.7617	1.7581	.2573	.2570	.2567
59	1.8060	1.8022	1.7984	.2658	.2655	.2652
60	1.8488	1.8448	1.8408	.2747	.2744	.2741
61	1.8940	1.8898	1.8856	.2840	.2837	.2833
62	1.9417	1.9373	1.9329	.2938	.2934	.2930
63	1.9921	1.9875	1.9829	.3040	.3036	.3032
64	2.0455	2.0407	2.0358	.3147	.3142	.3138
65	2.1021	2.0970	2.0919	.3259	.3255	.3250
66	2.1621	2.1567	2.1514	.3378	.3373	.3368
67	2.2259	2.2203	2.2146	.3502	.3497	.3492
68	2.2938	2.2879	2.2819	.3634	.3629	.3623
69	2.3662	2.3600	2.3537	.3774	.3768	.3762
70	2.4436	2.4370	2.4303	.3922	.3916	.3910
71	2.5264	2.5194	2.5123	.4079	.4073	.4066
72	2.6152	2.6077	2.6003	.4247	.4240	.4233
73	2.7106	2.7027	2.6948	.4427	.4419	.4412
74	2.8134	2.8051	2.7967	.4619	.4611	.4603
75	2.9245	2.9156	2.9067	.4826	.4817	.4809
76	3.0449	3.0354	3.0259	.5049	.5040	.5030
77	3.1757	3.1656	3.1554	.5290	.5280	.5270
78	3.3184	3.3075	3.2966	.5553	.5541	.5531
79	3.4746	3.4629	3.4512	.5838	.5826	.5814
80	3.6462	3.6336	3.6210	.6152	.6138	.6125
81	3.8357	3.8221	3.8085	.6496	.6482	.6468
82	4.0460	4.0312	4.0165	.6878	.6862	.6846
83	4.2806	4.2645	4.2485	.7302	.7285	.7267
84	4.5440	4.5264	4.5090	.7777	.7758	.7740
85	4.8418	4.8226	4.8034	.8314	.8293	.8272
86	5.1813	5.1601	5.1390	.8925	.8901	.8878
87	5.5718	5.5482	5.5248	.9627	.9600	.9574
88	6.0257	5.9995	5.9733	1.0442	1.0412	1.0382
89	6.5601	6.5305	6.5010	1.1400	1.1366	1.1332
90	7.1984	7.1647	7.1312	1.2545	1.2506	1.2467

180

$180°-\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
45	-.1507	-.1506	-.1504	.0691	.0690	.0689
46	-.1545	-.1544	-.1543	.0730	.0729	.0728
47	-.1584	-.1583	-.1582	.0771	.0770	.0769
48	-.1624	-.1622	-.1621	.0814	.0813	.0812
49	-.1663	-.1662	-.1661	.0859	.0858	.0857
50	-.1704	-.1702	-.1701	.0906	.0905	.0904
51	-.1744	-.1743	-.1741	.0955	.0954	.0953
52	-.1785	-.1784	-.1782	.1007	.1005	.1004
53	-.1827	-.1825	-.1823	.1061	.1060	.1058
54	-.1869	-.1867	-.1865	.1118	.1116	.1115
55	-.1911	-.1909	-.1906	.1177	.1176	.1174
56	-.1954	-.1952	-.1950	.1240	.1238	.1237
57	-.1998	-.1996	-.1994	.1306	.1304	.1302
58	-.2042	-.2040	-.2038	.1375	.1373	.1371
59	-.2087	-.2084	-.2082	.1448	.1446	.1444
60	-.2132	-.2130	-.2127	.1525	.1522	.1520
61	-.2178	-.2175	-.2173	.1606	.1603	.1601
62	-.2224	-.2222	-.2219	.1691	.1689	.1686
63	-.2271	-.2269	-.2266	.1782	.1779	.1776
64	-.2319	-.2316	-.2314	.1877	.1874	.1871
65	-.2367	-.2364	-.2362	.1979	.1976	.1972
66	-.2417	-.2413	-.2411	.2087	.2083	.2080
67	-.2466	-.2463	-.2460	.2201	.2197	.2194
68	-.2517	-.2513	-.2510	.2323	.2319	.2315
69	-.2568	-.2564	-.2561	.2453	.2448	.2444
70	-.2620	-.2616	-.2613	.2592	.2587	.2582
71	-.2672	-.2669	-.2665	.2740	.2735	.2730
72	-.2726	-.2722	-.2718	.2899	.2894	.2888
73	-.2780	-.2775	-.2772	.3071	.3064	.3058
74	-.2834	-.2830	-.2826	.3255	.3248	.3242
75	-.2889	-.2885	-.2881	.3454	.3447	.3440
76	-.2945	-.2941	-.2936	.3670	.3662	.3654
77	-.3002	-.2997	-.2992	.3905	.3896	.3888
78	-.3058	-.3053	-.3049	.4161	.4151	.4142
79	-.3115	-.3110	-.3105	.4441	.4430	.4420
80	-.3172	-.3167	-.3162	.4749	.4737	.4726
81	-.3229	-.3224	-.3218	.5089	.5076	.5063
82	-.3285	-.3280	-.3274	.5466	.5452	.5436
83	-.3341	-.3335	-.3329	.5887	.5871	.5855
84	-.3394	-.3388	-.3382	.6359	.6342	.6324
85	-.3446	-.3439	-.3433	.6893	.6874	.6854
86	-.3494	-.3487	-.3481	.7502	.7480	.7458
87	-.3536	-.3530	-.3523	.8203	.8178	.8153
88	-.3572	-.3565	-.3558	.9017	.8989	.8960
89	-.3597	-.3589	-.3583	.9975	.9943	.9910
90	-.3606	-.3599	-.3592	1.1120	1.1082	1.1045

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$180° - \phi$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
0	1.0000	1.0000	1.0000	.0000	.0000	.0000
1	1.0001	1.0001	1.0001	.0015	.0015	.0015
2	1.0006	1.0005	1.0005	.0031	.0031	.0031
3	1.0013	1.0013	1.0012	.0046	.0046	.0046
4	1.0024	1.0023	1.0023	.0061	.0061	.0061
5	1.0037	1.0037	1.0036	.0077	.0077	.0077
6	1.0054	1.0053	1.0052	.0092	.0092	.0092
7	1.0074	1.0073	1.0072	.0108	.0108	.0108
8	1.0097	1.0096	1.0094	.0123	.0123	.0123
9	1.0123	1.0122	1.0120	.0139	.0139	.0139
10	1.0153	1.0151	1.0149	.0155	.0155	.0155
11	1.0185	1.0183	1.0182	.0170	.0170	.0170
12	1.0221	1.0219	1.0217	.0186	.0186	.0186
13	1.0260	1.0258	1.0256	.0202	.0202	.0202
14	1.0303	1.0301	1.0299	.0219	.0218	.0218
15	1.0349	1.0347	1.0344	.0235	.0235	.0235
16	1.0399	1.0396	1.0394	.0251	.0251	.0251
17	1.0452	1.0450	1.0447	.0268	.0268	.0268
18	1.0509	1.0506	1.0503	.0284	.0284	.0284
19	1.0570	1.0567	1.0564	.0301	.0301	.0301
20	1.0635	1.0632	1.0628	.0318	.0318	.0318
21	1.0704	1.0700	1.0696	.0336	.0336	.0336
22	1.0776	1.0773	1.0769	.0353	.0353	.0353
23	1.0853	1.0849	1.0845	.0371	.0371	.0371
24	1.0934	1.0930	1.0926	.0389	.0389	.0389
25	1.1020	1.1016	1.1011	.0407	.0407	.0407
26	1.1110	1.1106	1.1101	.0425	.0425	.0425
27	1.1206	1.1201	1.1196	.0444	.0444	.0444
28	1.1305	1.1300	1.1295	.0463	.0463	.0463
29	1.1411	1.1405	1.1400	.0483	.0482	.0482
30	1.1521	1.1515	1.1510	.0502	.0502	.0502
31	1.1637	1.1631	1.1625	.0522	.0522	.0522
32	1.1758	1.1752	1.1746	.0543	.0543	.0542
33	1.1886	1.1879	1.1873	.0564	.0564	.0563
34	1.2019	1.2013	1.2006	.0585	.0585	.0585
35	1.2159	1.2152	1.2145	.0607	.0607	.0606
36	1.2306	1.2299	1.2291	.0629	.0629	.0628
37	1.2460	1.2452	1.2444	.0652	.0651	.0651
38	1.2621	1.2613	1.2605	.0675	.0675	.0674
39	1.2789	1.2781	1.2773	.0699	.0699	.0698
40	1.2966	1.2958	1.2949	.0723	.0723	.0723
41	1.3152	1.3143	1.3134	.0748	.0748	.0748
42	1.3346	1.3337	1.3327	.0774	.0774	.0774
43	1.3550	1.3540	1.3530	.0801	.0800	.0800
44	1.3763	1.3753	1.3743	.0828	.0828	.0827

180°−φ°	ξ			η		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
0	.0000	.0000	.0000	.0000	.0000	.0000
1	−.0015	−.0015	−.0015	.0000	.0000	.0000
2	−.0031	−.0031	−.0031	.0001	.0001	.0001
3	−.0046	−.0046	−.0046	.0001	.0001	.0001
4	−.0061	−.0061	−.0061	.0002	.0002	.0002
5	−.0077	−.0077	−.0077	.0003	.0003	.0003
6	−.0092	−.0092	−.0092	.0005	.0005	.0005
7	−.0108	−.0107	−.0107	.0007	.0007	.0007
8	−.0123	−.0123	−.0123	.0009	.0009	.0009
9	−.0138	−.0138	−.0138	.0011	.0011	.0011
10	−.0154	−.0154	−.0154	.0014	.0014	.0014
11	−.0169	−.0169	−.0169	.0016	.0016	.0016
12	−.0185	−.0185	−.0185	.0020	.0020	.0020
13	−.0201	−.0201	−.0201	.0023	.0023	.0023
14	−.0216	−.0216	−.0216	.0027	.0027	.0027
15	−.0232	−.0232	−.0232	.0031	.0031	.0031
16	−.0248	−.0248	−.0248	.0035	.0035	.0035
17	−.0264	−.0264	−.0264	.0040	.0040	.0040
18	−.0280	−.0280	−.0280	.0045	.0045	.0045
19	−.0296	−.0296	−.0296	.0050	.0050	.0050
20	−.0312	−.0312	−.0312	.0056	.0056	.0056
21	−.0328	−.0328	−.0328	.0062	.0062	.0062
22	−.0344	−.0344	−.0344	.0069	.0068	.0068
23	−.0361	−.0360	−.0360	.0075	.0075	.0075
24	−.0377	−.0377	−.0377	.0082	.0082	.0082
25	−.0394	−.0393	−.0393	.0090	.0090	.0090
26	−.0410	−.0410	−.0410	.0098	.0098	.0098
27	−.0427	−.0427	−.0427	.0106	.0106	.0106
28	−.0444	−.0444	−.0444	.0115	.0115	.0115
29	−.0461	−.0461	−.0461	.0124	.0124	.0124
30	−.0478	−.0478	−.0478	.0134	.0134	.0134
31	−.0495	−.0495	−.0495	.0144	.0144	.0144
32	−.0513	−.0513	−.0513	.0155	.0155	.0155
33	−.0530	−.0530	−.0530	.0166	.0166	.0166
34	−.0548	−.0548	−.0548	.0178	.0178	.0178
35	−.0566	−.0566	−.0566	.0190	.0190	.0190
36	−.0584	−.0584	−.0584	.0203	.0203	.0203
37	−.0602	−.0602	−.0602	.0217	.0217	.0216
38	−.0621	−.0621	−.0620	.0231	.0231	.0231
39	−.0639	−.0639	−.0639	.0246	.0246	.0245
40	−.0658	−.0658	−.0658	.0261	.0261	.0261
41	−.0677	−.0677	−.0677	.0277	.0277	.0277
42	−.0697	−.0697	−.0696	.0295	.0294	.0294
43	−.0716	−.0716	−.0716	.0312	.0312	.0312
44	−.0736	−.0736	−.0736	.0331	.0331	.0331
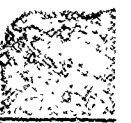
$180° - \phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
45	1.3988	1.3977	1.3966	.0856	.0856	.0855
46	1.4223	1.4212	1.4201	.0885	.0885	.0884
47	1.4470	1.4458	1.4446	.0915	.0915	.0914
48	1.4729	1.4717	1.4705	.0946	.0945	.0945
49	1.5002	1.4989	1.4976	.0978	.0978	.0977
50	1.5289	1.5275	1.5262	.1011	.1011	.1010
51	1.5590	1.5576	1.5562	.1045	.1045	.1044
52	1.5908	1.5894	1.5879	.1081	.1081	.1080
53	1.6243	1.6229	1.6212	.1118	.1118	.1117
54	1.6596	1.6580	1.6564	.1157	.1156	.1156
55	1.6969	1.6952	1.6935	.1197	.1197	.1196
56	1.7363	1.7345	1.7328	.1239	.1238	.1238
57	1.7780	1.7761	1.7743	.1283	.1282	.1282
58	1.8221	1.8202	1.8182	.1329	.1328	.1328
59	1.8689	1.8668	1.8648	.1377	.1377	.1376
60	1.9186	1.9164	1.9143	.1428	.1427	.1426
61	1.9714	1.9691	1.9669	.1481	.1480	.1479
62	2.0276	2.0252	2.0228	.1538	.1537	.1536
63	2.0875	2.0850	2.0825	.1597	.1596	.1595
64	2.1516	2.1489	2.1463	.1660	.1659	.1658
65	2.2201	2.2173	2.2145	.1727	.1725	.1724
66	2.2935	2.2906	2.2876	.1798	.1796	.1795
67	2.3725	2.3693	2.3662	.1873	.1872	.1870
68	2.4575	2.4542	2.4508	.1954	.1953	.1951
69	2.5493	2.5457	2.5422	.2041	.2039	.2038
70	2.6486	2.6448	2.6411	.2134	.2132	.2131
71	2.7565	2.7524	2.7484	.2235	.2233	.2231
72	2.8739	2.8696	2.8653	.2344	.2341	.2339
73	3.0023	2.9977	2.9931	.2462	.2460	.2457
74	3.1432	3.1382	3.1332	.2591	.2589	.2586
75	3.2984	3.2930	3.2876	.2733	.2730	.2727
76	3.4701	3.4643	3.4585	.2889	.2885	.2883
77	3.6611	3.6548	3.6485	.3061	.3058	.3055
78	3.8748	3.8680	3.8611	.3254	.3250	.3246
79	4.1155	4.1079	4.1004	.3469	.3465	.3461
80	4.3883	4.3801	4.3718	.3714	.3709	.3704
81	4.7004	4.6912	4.6821	.3991	.3987	.3982
82	5.0605	5.0504	5.0402	.4312	.4306	.4300
83	5.4807	5.4693	5.4579	.4684	.4678	.4671
84	5.9772	5.9644	5.9515	.5124	.5116	.5109
85	6.5729	6.5582	6.5434	.5649	.5641	.5632
86	7.3004	7.2835	7.2664	.6291	.6281	.6271
87	8.2091	8.1891	8.1691	.7091	.7079	.7067
88	9.3759	9.3520	9.3281	.8118	.8103	.8089
89	10.9293	10.8998	10.8704	.9483	.9465	.9447
90	13.0992	13.0619	13.0246	1.1391	1.1367	1.1344

180°-ϕ°	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
45	-.0756	-.0756	-.0756	.0351	.0351	.0351
46	-.0777	-.0776	-.0776	.0372	.0371	.0371
47	-.0797	-.0797	-.0796	.0393	.0393	.0393
48	-.0818	-.0818	-.0817	.0416	.0416	.0416
49	-.0839	-.0839	-.0839	.0440	.0440	.0440
50	-.0861	-.0860	-.0860	.0465	.0465	.0465
51	-.0883	-.0882	-.0882	.0493	.0492	.0491
52	-.0905	-.0904	-.0904	.0520	.0520	.0519
53	-.0927	-.0927	-.0927	.0549	.0549	.0549
54	-.0950	-.0950	-.0949	.0580	.0580	.0580
55	-.0974	-.0973	-.0973	.0613	.0613	.0612
56	-.0998	-.0997	-.0997	.0648	.0647	.0647
57	-.1022	-.1021	-.1021	.0684	.0684	.0663
58	-.1047	-.1046	-.1045	.0723	.0723	.0722
59	-.1072	-.1071	-.1071	.0764	.0764	.0763
60	-.1098	-.1097	-.1096	.0808	.0807	.0807
61	-.1124	-.1123	-.1122	.0854	.0854	.0853
62	-.1151	-.1150	-.1149	.0904	.0903	.0902
63	-.1178	-.1177	-.1177	.0956	.0956	.0955
64	-.1206	-.1205	-.1205	.1013	.1012	.1011
65	-.1235	-.1234	-.1233	.1073	.1072	.1071
66	-.1264	-.1263	-.1263	.1138	.1137	.1136
67	-.1294	-.1294	-.1293	.1207	.1206	.1205
68	-.1325	-.1324	-.1324	.1282	.1281	.1279
69	-.1357	-.1356	-.1355	.1362	.1361	.1360
70	-.1390	-.1389	-.1388	.1450	.1448	.1447
71	-.1423	-.1422	-.1421	.1544	.1543	.1541
72	-.1458	-.1457	-.1456	.1648	.1646	.1644
73	-.1493	-.1492	-.1491	.1761	.1759	.1757
74	-.1530	-.1529	-.1528	.1884	.1882	.1880
75	-.1568	-.1567	-.1565	.2021	.2019	.2016
76	-.1607	-.1606	-.1604	.2173	.2169	.2167
77	-.1647	-.1646	-.1644	.2340	.2337	.2334
78	-.1689	-.1687	-.1686	.2528	.2525	.2521
79	-.1732	-.1730	-.1729	.2739	.2736	.2732
80	-.1776	-.1775	-.1773	.2979	.2975	.2971
81	-.1822	-.1820	-.1819	.3253	.3249	.3244
82	-.1869	-.1867	-.1866	.3570	.3565	.3560
83	-.1918	-.1916	-.1914	.3939	.3933	.3927
84	-.1967	-.1965	-.1963	.4376	.4369	.4362
85	-.2018	-.2016	-.2014	.4899	.4891	.4883
86	-.2068	-.2066	-.2063	.5539	.5529	.5520
87	-.2116	-.2114	-.2112	.6337	.6326	.6315
88	-.2161	-.2158	-.2156	.7363	.7349	.7335
89	-.2196	-.2193	-.2191	.8728	.8711	.8693
90	-.2212	-.2209	-.2206	1.0636	1.0613	1.0590

TABLE 4 - QUADRANT 1

Reference Point at $\phi' = 180°$

$$\phi_c = 5°$$

$\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
90	.8558	.7152	.5976	16.5132	15.1523	13.9409
89	.8561	.7155	.5980	16.5282	15.1648	13.9513
88	.8564	.7159	.5984	16.5431	15.1773	13.9618
87	.8566	.7162	.5988	16.5581	15.1899	13.9722
86	.8569	.7165	.5992	16.5731	15.2024	13.9827
85	.8572	.7169	.5996	16.5882	15.2150	13.9933
84	.8574	.7172	.6000	16.6033	15.2276	14.0038
83	.8577	.7176	.6004	16.6185	15.2403	14.0145
82	.8580	.7179	.6008	16.6337	15.2531	14.0251
81	.8582	.7183	.6012	16.6491	15.2659	14.0359
80	.8585	.7187	.6016	16.6645	15.2788	14.0467
79	.8588	.7190	.6020	16.6800	15.2918	14.0575
78	.8590	.7194	.6024	16.6957	15.3049	14.0685
77	.8593	.7197	.6028	16.7114	15.3181	14.0796
76	.8596	.7201	.6032	16.7273	15.3314	14.0907
75	.8599	.7205	.6037	16.7434	15.3449	14.1020
74	.8602	.7208	.6041	16.7595	15.3585	14.1134
73	.8604	.7212	.6045	16.7759	15.3722	14.1249
72	.8607	.7216	.6050	16.7925	15.3861	14.1365
71	.8610	.7220	.6054	16.8093	15.4001	14.1483
70	.8613	.7224	.6058	16.8262	15.4143	14.1602
69	.8616	.7228	.6063	16.8434	15.4287	14.1723
68	.8619	.7231	.6067	16.8608	15.4434	14.1846
67	.8622	.7235	.6072	16.8785	15.4582	14.1970
66	.8625	.7240	.6077	16.8965	15.4733	14.2097
65	.8628	.7244	.6081	16.9147	15.4886	14.2225
64	.8631	.7248	.6086	16.9333	15.5042	14.2356
63	.8634	.7252	.6091	16.9522	15.5201	14.2489
62	.8638	.7256	.6096	16.9714	15.5362	14.2625
61	.8641	.7261	.6101	16.9910	15.5527	14.2764
60	.8644	.7265	.6106	17.0110	15.5695	14.2905
59	.8648	.7270	.6112	17.0315	15.5867	14.3049
58	.8651	.7275	.6117	17.0524	15.6043	14.3197
57	.8655	.7279	.6123	17.0737	15.6222	14.3348
56	.8658	.7284	.6128	17.0956	15.6406	14.3503
55	.8662	.7289	.6134	17.1180	15.6595	14.3661
54	.8666	.7294	.6140	17.1409	15.6788	14.3824
53	.8669	.7299	.6146	17.1645	15.6986	14.3991
52	.8673	.7305	.6152	17.1888	15.7190	14.4163
51	.8677	.7310	.6158	17.2137	15.7400	14.4340
50	.8681	.7316	.6165	17.2393	15.7616	14.4522
49	.8685	.7321	.6172	17.2658	15.7839	14.4710
48	.8690	.7327	.6179	17.2930	15.8069	14.4904
47	.8694	.7333	.6186	17.3212	15.8307	14.5104
46	.8699	.7340	.6193	17.3504	15.8553	14.5311
45	.8703	.7346	.6201	17.3805	15.8807	14.5526
44	.8708	.7353	.6209	17.4118	15.9071	14.5749
43	.8713	.7360	.6217	17.4443	15.9346	14.5981
42	.8718	.7367	.6225	17.4780	15.9631	14.6222
41	.8723	.7374	.6234	17.5132	15.9928	14.6473

$\phi°$	ζ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
90	-15.7066	-14.4710	-13.3637	2.7499	2.3882	2.0772
89	-15.7085	-14.4709	-13.3636	2.7649	2.4007	2.0876
88	-15.7081	-14.4706	-13.3634	2.7798	2.4132	2.0981
87	-15.7075	-14.4700	-13.3629	2.7948	2.4257	2.1085
86	-15.7065	-14.4693	-13.3623	2.8098	2.4383	2.1190
85	-15.7054	-14.4683	-13.3614	2.8248	2.4508	2.1295
84	-15.7039	-14.4671	-13.3604	2.8398	2.4634	2.1400
83	-15.7022	-14.4656	-13.3592	2.8549	2.4760	2.1506
82	-15.7002	-14.4640	-13.3578	2.8700	2.4887	2.1612
81	-15.6979	-14.4621	-13.3562	2.8852	2.5013	2.1718
80	-15.6954	-14.4599	-13.3545	2.9004	2.5141	2.1825
79	-15.6926	-14.4576	-13.3525	2.9157	2.5269	2.1931
78	-15.6894	-14.4550	-13.3503	2.9310	2.5397	2.2039
77	-15.6860	-14.4521	-13.3479	2.9464	2.5526	2.2147
76	-15.6823	-14.4490	-13.3453	2.9618	2.5655	2.2255
75	-15.6783	-14.4456	-13.3425	2.9773	2.5785	2.2364
74	-15.6740	-14.4420	-13.3394	2.9930	2.5916	2.2474
73	-15.6693	-14.4381	-13.3362	3.0087	2.6048	2.2584
72	-15.6643	-14.4339	-13.3327	3.0244	2.6180	2.2695
71	-15.6590	-14.4295	-13.3289	3.0403	2.6313	2.2807
70	-15.6534	-14.4247	-13.3249	3.0563	2.6447	2.2919
69	-15.6473	-14.4197	-13.3207	3.0724	2.6582	2.3033
68	-15.6409	-14.4143	-13.3162	3.0886	2.6718	2.3147
67	-15.6342	-14.4086	-13.3115	3.1050	2.6856	2.3262
66	-15.6270	-14.4026	-13.3064	3.1215	2.6994	2.3378
65	-15.6195	-14.3963	-13.3011	3.1381	2.7133	2.3495
64	-15.6115	-14.3896	-13.2954	3.1548	2.7274	2.3613
63	-15.6030	-14.3825	-13.2895	3.1717	2.7416	2.3732
62	-15.5941	-14.3750	-13.2832	3.1888	2.7559	2.3853
61	-15.5848	-14.3672	-13.2766	3.2060	2.7704	2.3974
60	-15.5749	-14.3589	-13.2697	3.2235	2.7851	2.4097
59	-15.5646	-14.3502	-13.2623	3.2411	2.7998	2.4222
58	-15.5536	-14.3410	-13.2546	3.2589	2.8148	2.4348
57	-15.5432	-14.3313	-13.2465	3.2769	2.8300	2.4475
56	-15.5301	-14.3212	-13.2380	3.2951	2.8453	2.4604
55	-15.5174	-14.3105	-13.2290	3.3136	2.8608	2.4735
54	-15.5041	-14.2993	-13.2195	3.3323	2.8766	2.4867
53	-15.4901	-14.2875	-13.2096	3.3512	2.8925	2.5001
52	-15.4753	-14.2751	-13.1991	3.3704	2.9087	2.5138
51	-15.4598	-14.2620	-13.1881	3.3899	2.9251	2.5276
50	-15.4435	-14.2482	-13.1765	3.4097	2.9418	2.5417
49	-15.4363	-14.2338	-13.1643	3.4298	2.9587	2.5559
48	-15.4082	-14.2185	-13.1515	3.4503	2.9760	2.5705
47	-15.3892	-14.2025	-13.1380	3.4710	2.9935	2.5852
46	-15.3691	-14.1856	-13.1237	3.4922	3.0113	2.6003
45	-15.3480	-14.1677	-13.1086	3.5137	3.0295	2.6156
44	-15.3257	-14.1489	-13.0927	3.5356	3.0480	2.6312
43	-15.3021	-14.1290	-13.0759	3.5580	3.0669	2.6472
42	-15.2772	-14.1080	-13.0581	3.5808	3.0861	2.6634
41	-15.2509	-14.0857	-13.0394	3.6040	3.1058	2.6801

$\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
40	.8729	.7382	.6243	17.5498	16.0237	14.6734
39	.8735	.7390	.6253	17.5880	16.0561	14.7008
38	.8741	.7399	.6263	17.6280	16.0899	14.7294
37	.8747	.7407	.6273	17.6698	16.1253	14.7594
36	.8753	.7416	.6284	17.7138	16.1625	14.7910
35	.8760	.7426	.6295	17.7603	16.2017	14.8241
34	.8767	.7436	.6307	17.8086	16.2429	14.8591
33	.8774	.7447	.6320	17.8599	16.2865	14.8960
32	.8782	.7458	.6333	17.9142	16.3326	14.9352
31	.8790	.7469	.6347	17.9718	16.3815	14.9767
30	.8798	.7482	.6362	18.0329	16.4334	15.0209
29	.8807	.7495	.6378	18.0981	16.4889	15.0681
28	.8817	.7509	.6395	18.1677	16.5481	15.1185
27	.8827	.7524	.6413	18.2423	16.6117	15.1727
26	.8837	.7540	.6433	18.3225	16.6801	15.2310
25	.8849	.7557	.6454	18.4090	16.7540	15.2940
24	.8861	.7576	.6477	18.5027	16.8340	15.3625
23	.8875	.7596	.6501	18.6046	16.9212	15.4370
22	.8889	.7618	.6528	18.7158	17.0164	15.5186
21	.8905	.7641	.6558	18.8380	17.1212	15.6084
20	.8922	.7668	.6590	18.9727	17.2369	15.7078
19	.8940	.7697	.6626	19.1224	17.3656	15.8185
18	.8961	.7729	.6666	19.2897	17.5098	15.9428
17	.8984	.7765	.6712	19.4782	17.6726	16.0833
16	.9010	.7806	.6763	19.6925	17.8580	16.2438
15	.9040	.7854	.6823	19.9387	18.0716	16.4291
14	.9074	.7908	.6892	20.2250	18.3207	16.6458
13	.9114	.7972	.6974	20.5627	18.6156	16.9033
12	.9161	.8049	.7072	20.9684	18.9713	17.2151
11	.9219	.8144	.7194	21.4669	19.4104	17.6020
10	.9290	.8263	.7350	22.0976	19.9695	18.0976
9	.9384	.8421	.7557	22.9288	20.7121	18.7611
8	.9513	.8643	.7852	24.0920	21.7625	19.7095
7	.9711	.8990	.8322	25.8921	23.4134	21.2236
6	1.0085	.9667	.9266	29.3394	26.6612	24.2837

$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
40	-15.2231	-14.0622	-13.0194	3.6278	3.1259	2.6971
39	-15.1936	-14.0372	-12.9983	3.6521	3.1465	2.7145
38	-15.1623	-14.0107	-12.9759	3.6770	3.1675	2.7323
37	-15.1291	-13.9826	-12.9521	3.7025	3.1891	2.7505
36	-15.0938	-13.9527	-12.9268	3.7286	3.2112	2.7693
35	-15.0562	-13.9208	-12.8998	3.7554	3.2340	2.7886
34	-15.0161	-13.8869	-12.8710	3.7830	3.2573	2.8084
33	-14.9733	-13.8505	-12.8401	3.8113	3.2814	2.8288
32	-14.9275	-13.8117	-12.8071	3.8405	3.3061	2.8498
31	-14.8784	-13.7700	-12.7717	3.8705	3.3317	2.8715
30	-14.8257	-13.7252	-12.7336	3.9016	3.3580	2.8939
29	-14.7690	-13.6769	-12.6926	3.9336	3.3853	2.9171
28	-14.7078	-13.6248	-12.6482	3.9669	3.4136	2.9412
27	-14.6416	-13.5685	-12.6002	4.0013	3.4429	2.9662
26	-14.5699	-13.5072	-12.5480	4.0371	3.4735	2.9922
25	-14.4918	-13.4406	-12.4911	4.0743	3.5052	3.0193
24	-14.4065	-13.3677	-12.4288	4.1132	3.5384	3.0477
23	-14.3131	-13.2878	-12.3605	4.1538	3.5732	3.0774
22	-14.2103	-13.1998	-12.2851	4.1963	3.6096	3.1086
21	-14.0967	-13.1023	-12.2015	4.2411	3.6480	3.1415
20	-13.9704	-12.9939	-12.1084	4.2882	3.6885	3.1763
19	-13.8294	-12.8726	-12.0040	4.3382	3.7315	3.2133
18	-13.6707	-12.7358	-11.8862	4.3912	3.7772	3.2527
17	-13.4909	-12.5806	-11.7522	4.4479	3.8261	3.2949
16	-13.2854	-12.4028	-11.5983	4.5087	3.8787	3.3405
15	-13.0481	-12.1969	-11.4197	4.5745	3.9358	3.3899
14	-12.7710	-11.9558	-11.2099	4.6461	3.9981	3.4442
13	-12.4425	-11.6690	-10.9595	4.7248	4.0668	3.5042
12	-12.0464	-11.3218	-10.6551	4.8125	4.1437	3.5716
11	-11.5580	-10.8914	-10.2759	4.9118	4.2311	3.6486
10	-10.9377	-10.3416	- 9.7886	5.0265	4.3328	3.7387
9	-10.1179	- 9.6092	- 9.1342	5.1633	4.4551	3.8479
8	- 8.9674	- 8.5703	- 8.1961	5.3346	4.6097	3.9876
7	- 7.1826	- 6.9334	- 6.6948	5.5682	4.8240	4.1840
6	- 3.7570	- 3.7060	- 3.6540	5.9545	5.1877	4.5266

$$\phi_c = 10°$$

$\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
90	.9857	.9016	.8247	8.6649	8.3106	7.9578
89	.9864	.9024	.8256	8.7021	8.3264	7.9722
88	.9871	.9032	.8265	8.7194	8.3422	7.9866
87	.9878	.9040	.8273	8.7367	8.3580	8.0011
86	.9886	.9048	.8282	8.7540	8.3739	8.0157
85	.9893	.9057	.8291	8.7714	8.3898	8.0302
84	.9900	.9065	.8300	8.7889	8.4058	8.0449
83	.9907	.9073	.8309	8.8065	8.4219	8.0596
82	.9914	.9081	.8318	8.8242	8.4331	8.0745
81	.9921	.9089	.8327	8.8419	8.4544	8.0894
80	.9928	.9097	.8336	8.8598	8.4708	8.1044
79	.9935	.9106	.8345	8.8779	8.4873	8.1196
78	.9943	.9114	.8354	8.8961	8.5040	8.1348
77	.9950	.9122	.8363	8.9144	8.5208	8.1502
76	.9957	.9131	.8373	8.9329	8.5377	8.1658
75	.9965	.9139	.8382	8.9516	8.5549	8.1815
74	.9972	.9148	.8392	8.9705	8.5722	8.1974
73	.9980	.9156	.8401	8.9896	8.5898	8.2135
72	.9987	.9165	.8411	9.0090	8.6075	8.2298
71	.9995	.9174	.8420	9.0286	8.6255	8.2463
70	1.0003	.9183	.8430	9.0485	8.6438	8.2631
69	1.0011	.9192	.8440	9.0686	8.6623	8.2801
68	1.0018	.9201	.8450	9.0891	8.6811	8.2973
67	1.0026	.9210	.8461	9.1098	8.7001	8.3148
66	1.0034	.9220	.8471	9.1310	8.7196	8.3327
65	1.0043	.9229	.8481	9.1525	8.7393	8.3508
64	1.0051	.9239	.8492	9.1743	8.7594	8.3693
63	1.0059	.9248	.8503	9.1966	8.7799	8.3881
62	1.0068	.9258	.8514	9.2194	8.8008	8.4074
61	1.0076	.9268	.8525	9.2426	8.8221	8.4270
60	1.0085	.9278	.8536	9.2663	8.8439	8.4470
59	1.0094	.9289	.8548	9.2905	8.8662	8.4676
58	1.0103	.9299	.8560	9.3153	8.8891	8.4886
57	1.0112	.9310	.8572	9.3407	8.9124	8.5101
56	1.0121	.9321	.8584	9.3667	8.9364	8.5321
55	1.0130	.9332	.8597	9.3934	8.9610	8.5548
54	1.0140	.9343	.8609	9.4208	8.9863	8.5781
53	1.0150	.9355	.8622	9.4490	9.0122	8.6020
52	1.0160	.9367	.8636	9.4781	9.0390	8.6267
51	1.0170	.9379	.8650	9.5080	9.0666	8.6521
50	1.0180	.9591	.8664	9.5388	9.0950	8.6783
49	1.0191	.9404	.8678	9.5706	9.1244	8.7055
48	1.0202	.9417	.8693	9.6036	9.1548	8.7335
47	1.0213	.9430	.8708	9.6376	9.1862	8.7625
46	1.0224	.9444	.8724	9.6729	9.2188	8.7927
45	1.0236	.9458	.8740	9.7096	9.2527	8.8239
44	1.0248	.9473	.8757	9.7477	9.2879	8.8565
43	1.0260	.9488	.8774	9.7873	9.3245	8.8903
42	1.0273	.9504	.8792	9.8286	9.3627	8.9257
41	1.0286	.9520	.8811	9.8717	9.4026	8.9626

ϕ°	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
90	− 7.8350	− 7.5255	− 7.2324	2.3710	2.2163	2.0725
89	− 7.8349	− 7.5254	− 7.2323	2.3882	2.2321	2.0869
88	− 7.8344	− 7.5249	− 7.2319	2.4054	2.2478	2.1013
87	− 7.8337	− 7.5242	− 7.2313	2.4227	2.2636	2.1158
86	− 7.8326	− 7.5233	− 7.2304	2.4400	2.2795	2.1303
85	− 7.8312	− 7.5220	− 7.2292	2.4574	2.2954	2.1449
84	− 7.8296	− 7.5205	− 7.2278	2.4748	2.3113	2.1594
83	− 7.8276	− 7.5187	− 7.2263	2.4922	2.3273	2.1741
82	− 7.8253	− 7.5166	− 7.2242	2.5098	2.3433	2.1888
81	− 7.8226	− 7.5142	− 7.2220	2.5273	2.3594	2.2035
80	− 7.8197	− 7.5114	− 7.2195	2.5450	2.3756	2.2184
79	− 7.8164	− 7.5084	− 7.2168	2.5627	2.3919	2.2332
78	− 7.8128	− 7.5051	− 7.2137	2.5805	2.4082	2.2482
77	− 7.8086	− 7.5015	− 7.2104	2.5984	2.4246	2.2633
76	− 7.8045	− 7.4975	− 7.2068	2.6165	2.4411	2.2784
75	− 7.7998	− 7.4932	− 7.2028	2.6346	2.4577	2.2936
74	− 7.7947	− 7.4886	− 7.1986	2.6528	2.4744	2.3089
73	− 7.7893	− 7.4836	− 7.1940	2.6711	2.4912	2.3244
72	− 7.7835	− 7.4783	− 7.1891	2.6896	2.5082	2.3399
71	− 7.7773	− 7.4725	− 7.1839	2.7082	2.5252	2.3556
70	− 7.7706	− 7.4665	− 7.1783	2.7269	2.5424	2.3714
69	− 7.7636	− 7.4600	− 7.1723	2.7458	2.5598	2.3873
68	− 7.7561	− 7.4531	− 7.1660	2.7648	2.5772	2.4033
67	− 7.7481	− 7.4458	− 7.1593	2.7840	2.5949	2.4195
66	− 7.7397	− 7.4380	− 7.1522	2.8034	2.6127	2.4359
65	− 7.7308	− 7.4299	− 7.1447	2.8229	2.6306	2.4524
64	− 7.7214	− 7.4212	− 7.1367	2.8427	2.6488	2.4691
63	− 7.7114	− 7.4121	− 7.1283	2.8626	2.6671	2.4859
62	− 7.7009	− 7.4024	− 7.1194	2.8828	2.6857	2.5030
61	− 7.6899	− 7.3922	− 7.1101	2.9032	2.7044	2.5202
60	− 7.6782	− 7.3815	− 7.1002	2.9238	2.7234	2.5377
59	− 7.6659	− 7.3702	− 7.0898	2.9447	2.7426	2.5553
58	− 7.6530	− 7.3583	− 7.0788	2.9658	2.7621	2.5732
57	− 7.6393	− 7.3457	− 7.0672	2.9872	2.7818	2.5914
56	− 7.6249	− 7.3325	− 7.0550	3.0089	2.8018	2.6098
55	− 7.6098	− 7.3185	− 7.0422	3.0309	2.8220	2.6285
54	− 7.5939	− 7.3039	− 7.0287	3.0533	2.8426	2.6474
53	− 7.5771	− 7.2884	− 7.0144	3.0759	2.8635	2.6667
52	− 7.5595	− 7.2721	− 6.9994	3.0989	2.8847	2.6862
51	− 7.5408	− 7.2550	− 6.9836	3.1223	2.9063	2.7061
50	− 7.5212	− 7.2369	− 6.9669	3.1461	2.9282	2.7264
49	− 7.5005	− 7.2178	− 6.9493	3.1703	2.9506	2.7470
48	− 7.4787	− 7.1976	− 6.9307	3.1950	2.9733	2.7680
47	− 7.4557	− 7.1764	− 6.9111	3.2201	2.9965	2.7894
46	− 7.4314	− 7.1539	− 6.8904	3.2457	3.0202	2.8112
45	− 7.4057	− 7.1302	− 6.8684	3.2719	3.0443	2.8336
44	− 7.3785	− 7.1051	− 6.8452	3.2986	3.0690	2.8564
43	− 7.3498	− 7.0785	− 6.8207	3.3258	3.0942	2.8797
42	− 7.3193	− 7.0504	− 6.7946	3.3537	3.1200	2.9035
41	− 7.2870	− 7.0205	− 6.7670	3.3823	3.1465	2.9280

73

ϕ^c	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
40	1.0299	.9536	.8830	9.9168	9.4444	9.0012
39	1.0313	.9554	.8650	9.9640	9.4881	9.0417
38	1.0328	.9572	.8871	10.0136	9.5340	9.0843
37	1.0343	.9590	.8893	10.0657	9.5823	9.1291
36	1.0358	.9610	.8915	10.1206	9.6332	9.1763
35	1.0374	.9630	.8939	10.1785	9.6870	9.2262
34	1.0391	.9651	.8964	10.2398	9.7439	9.2790
33	1.0408	.9674	.8991	10.3049	9.8044	9.3352
32	1.0427	.9697	.9018	10.3741	9.8687	9.3950
31	1.0446	.9722	.9048	10.4479	9.9374	9.4589
30	1.0466	.9748	.9079	10.5268	10.0109	9.5273
29	1.0487	.9775	.9112	10.6116	10.0898	9.6009
28	1.0510	.9805	.9147	10.7029	10.1750	9.6803
27	1.0534	.9836	.9185	10.8016	10.2671	9.7663
26	1.0559	.9870	.9226	10.9089	10.3674	9.8599
25	1.0586	.9906	.9270	11.0259	10.4769	9.9624
24	1.0615	.9946	.9319	11.1544	10.5971	10.0750
23	1.0647	.9989	.9371	11.2962	10.7301	10.1996
22	1.0681	1.0036	.9429	11.4539	10.8781	10.3386
21	1.0718	1.0087	.9494	11.6305	11.0442	10.4948
20	1.0760	1.0145	.9566	11.8302	11.2323	10.6720
19	1.0806	1.0210	.9647	12.0584	11.4477	10.8753
18	1.0858	1.0285	.9741	12.3227	11.6977	11.1118
17	1.0918	1.0371	.9851	12.6337	11.9927	11.3917
16	1.0988	1.0473	.9982	13.0072	12.3482	11.7298
15	1.1071	1.0597	1.0142	13.4681	12.7884	12.1503
14	1.1176	1.0753	1.0347	14.0585	13.3550	12.6941
13	1.1313	1.0963	1.0624	14.8586	14.1276	13.4402
12	1.1511	1.1272	1.1039	16.0514	15.2896	14.5722
11	1.1861	1.1835	1.1808	18.2338	17.4470	16.7049

$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
40	-7.2528	-6.9887	-6.7376	3.4116	3.1736	2.9531
39	-7.2163	-6.9550	-6.7063	3.4416	3.2014	2.9788
38	-7.1775	-6.9190	-6.6730	3.4725	3.2300	3.0053
37	-7.1362	-6.8807	-6.6375	3.5042	3.2594	3.0326
36	-7.0921	-6.8398	-6.5996	3.5368	3.2896	3.0607
35	-7.0449	-6.7960	-6.5589	3.5705	3.3209	3.0896
34	-6.9944	-6.7491	-6.5154	3.6052	3.3531	3.1196
33	-6.9401	-6.6987	-6.4685	3.6411	3.3864	3.1506
32	-6.8818	-6.6444	-6.4181	3.6783	3.4210	3.1827
31	-6.8188	-6.5859	-6.3636	3.7168	3.4569	3.2161
30	-6.7508	-6.5226	-6.3046	3.7569	3.4942	3.2508
29	-6.6770	-6.4538	-6.2406	3.7986	3.5330	3.2870
28	-6.5968	-6.3790	-6.1708	3.8422	3.5737	3.3249
27	-6.5092	-6.2973	-6.0945	3.8877	3.6162	3.3646
26	-6.4132	-6.2076	-6.0107	3.9356	3.6609	3.4064
25	-6.3076	-6.1087	-5.9183	3.9860	3.7080	3.4504
24	-6.1906	-5.9993	-5.8158	4.0392	3.7579	3.4971
23	-6.0606	-5.8773	-5.7015	4.0958	3.8109	3.5468
22	-5.9149	-5.7406	-5.5731	4.1561	3.8675	3.6000
21	-5.7506	-5.5861	-5.4378	4.2208	3.9284	3.6572
20	-5.5636	-5.4098	-5.2618	4.2907	3.9942	3.7192
19	-5.3484	-5.2068	-5.0701	4.3668	4.0661	3.7870
18	-5.0978	-4.9697	-4.8458	4.4506	4.1453	3.8620
17	-4.8011	-4.6883	-4.5789	4.5440	4.2340	3.9461
16	-4.4430	-4.3475	-4.2546	4.6500	4.3348	4.0421
15	-3.9988	-3.9232	-3.8494	4.7730	4.4523	4.1543
14	-3.4271	-3.3746	-3.3229	4.9206	4.5940	4.2902
13	-2.6490	-2.6233	-2.5973	5.1070	4.7740	4.4640
12	-1.4844	-1.4886	-1.4920	5.3644	5.0247	4.7083
11	.6547	.6259	.5984	5.7972	5.4524	5.1310

$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
40	- 7.2528	- 6.9887	- 6.7376	3.4116	3.1736	2.9531
39	- 7.2163	- 6.9550	- 6.7063	3.4416	3.2014	2.9788
38	- 7.1775	- 6.9190	- 6.6730	3.4725	3.2300	3.0053
37	- 7.1362	- 6.8807	- 6.6375	3.5042	3.2594	3.0326
36	- 7.0921	- 6.8398	- 6.5996	3.5368	3.2896	3 0607
35	- 7.0449	- 6.7960	- 6.5589	3.5705	3.3209	3.0896
34	- 6.9944	- 6.7491	- 6.5154	3.6052	3.3531	3.1196
33	- 6.9401	- 6.6987	- 6.4685	3.6411	3.3864	3.1506
32	- 6.8818	- 6.6444	- 6.4181	3.6783	3.4210	3.1827
31	- 6.8188	- 6.5859	- 6.3636	3.7168	3.4569	3.2161
30	- 6.7508	- 6.5236	- 6.3046	3.7569	3.4942	3.2508
29	- 6.6770	- 6.4538	- 6.2406	3.7986	3.5330	3.2870
28	- 6.5968	- 6.3790	- 6.1708	3.8422	3.5737	3.3249
27	- 6.5092	- 6.2973	- 6.0945	3.8877	3.6162	3.3646
26	- 6.4132	- 6.2076	- 6.0107	3.9356	3.6609	3.4064
25	- 6.3076	- 6.1087	- 5.9183	3.9860	3.7080	3.4504
24	- 6.1906	- 5.9993	- 5.8158	4.0392	3.7579	3.4971
23	- 6.0606	- 5.8773	- 5.7015	4.0958	3.8109	3.5468
22	- 5.9149	- 5.7406	- 5.5731	4.1561	3.8675	3.6000
21	- 5.7506	- 5.5861	- 5.4278	4.2208	3.9284	3.6572
20	- 5.5636	- 5.4098	- 5.2618	4.2907	3.9942	3.7192
19	- 5.3484	- 5.2068	- 5.0701	4.3668	4.0661	3.7870
18	- 5.0978	- 4.9697	- 4.8458	4.4505	4.1453	3.8620
17	- 4.8011	- 4.6883	- 4.5789	4.5443	4.2340	3.9461
16	- 4.4430	- 4.3475	- 4.2546	4.6500	4.3348	4.0421
15	- 3.9988	- 3.9232	- 3.8494	4.7730	4.4523	4.1543
14	- 3.4271	- 3.3746	- 3.3229	4.9206	4.5940	4.2903
13	- 2.6490	- 2.6233	- 2.5973	5.1070	4.7740	4.4640
12	- 1.4844	- 1.4886	- 1.4920	5.3644	5.0247	4.7083
11	.6547	.6259	.5984	5.7972	5.4524	5.1310

$$\phi_c = 15°$$

φ°	τ			σ		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
90	1.0864	1.0244	.9659	5.9335	5.7605	5.5941
89	1.0880	1.0260	.9675	5.9525	5.7784	5.6110
88	1.0895	1.0276	.9692	5.9716	5.7964	5.6279
87	1.0910	1.0292	.9709	5.9907	5.8144	5.6449
86	1.0925	1.0308	.9726	6.0099	5.8325	5.6620
85	1.0940	1.0324	.9743	6.0292	5.8507	5.6792
84	1.0956	1.0341	.9760	6.0486	5.8691	5.6965
83	1.0971	1.0357	.9778	6.0681	5.8875	5.7139
82	1.0987	1.0374	.9795	6.0878	5.9061	5.7315
81	1.1002	1.0390	.9812	6.1077	5.9248	5.7492
80	1.1018	1.0407	.9830	6.1276	5.9437	5.7670
79	1.1034	1.0424	.9848	6.1478	5.9627	5.7850
78	1.1049	1.0441	.9865	6.1682	5.9820	5.8032
77	1.1065	1.0458	.9883	6.1887	6.0014	5.8215
76	1.1082	1.0475	.9901	6.2095	6.0211	5.8401
75	1.1098	1.0492	.9920	6.2306	6.0410	5.8589
74	1.1114	1.0510	.9938	6.2519	6.0611	5.8780
73	1.1131	1.0527	.9957	6.2735	6.0815	5.8973
72	1.1147	1.0545	.9976	6.2953	6.1022	5.9168
71	1.1164	1.0563	.9995	6.3175	6.1232	5.9367
70	1.1181	1.0581	1.0014	6.3401	6.1445	5.9569
69	1.1198	1.0600	1.0033	6.3630	6.1662	5.9774
68	1.1216	1.0618	1.0053	6.3862	6.1882	5.9982
67	1.1233	1.0637	1.0073	6.4099	6.2107	6.0195
66	1.1251	1.0656	1.0093	6.4340	6.2335	6.0411
65	1.1269	1.0676	1.0114	6.4586	6.2558	6.0632
64	1.1287	1.0695	1.0135	6.4837	6.2806	6.0857
63	1.1306	1.0715	1.0156	6.5093	6.3048	6.1087
62	1.1324	1.0735	1.0177	6.5355	6.3296	6.1322
61	1.1343	1.0756	1.0199	6.5623	6.3550	6.1563
60	1.1363	1.0777	1.0221	6.5897	6.3810	6.1809
59	1.1382	1.0798	1.0244	6.6177	6.4076	6.2062
58	1.1402	1.0820	1.0267	6.6465	6.4349	6.2321
57	1.1422	1.0842	1.0291	6.6761	6.4630	6.2587
56	1.1443	1.0864	1.0315	6.7064	6.4918	6.2861
55	1.1464	1.0887	1.0339	6.7377	6.5215	6.3142
54	1.1485	1.0910	1.0364	6.7698	6.5520	6.3433
53	1.1507	1.0934	1.0390	6.8030	6.5835	6.3732
52	1.1529	1.0959	1.0416	6.8372	6.6161	6.4041
51	1.1552	1.0984	1.0443	6.8726	6.6497	6.4361
50	1.1575	1.1009	1.0471	6.9092	6.6845	6.4692
49	1.1599	1.1036	1.0499	6.9472	6.7206	6.5035
48	1.1623	1.1062	1.0529	6.9865	6.7581	6.5392
47	1.1648	1.1090	1.0559	7.0274	6.7970	6.5762
46	1.1674	1.1119	1.0590	7.0700	6.8375	6.6148
45	1.1700	1.1148	1.0622	7.1143	6.8797	6.6550
44	1.1728	1.1178	1.0655	7.1606	6.9239	6.6971
43	1.1755	1.1209	1.0689	7.2090	6.9700	6.7411
42	1.1784	1.1242	1.0724	7.2597	7.0183	6.7872
41	1.1814	1.1275	1.0761	7.3129	7.0691	6.8356

$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
9̂	− 5.0783	− 4.9476	− 4.8215	2.1021	2.0129	1.9278
̂9	− 5.0781	− 4.9474	− 4.8214	2.1211	3.0308	1.9447
̂	− 5.0776	− 4.9469	− 4.8209	2.1401	2.0488	1.9616
87	− 5.0768	− 4.9462	− 4.8202	2.1592	2.0668	1.9786
86	− 5.0756	− 4.9450	− 4.8192	2.1784	2.0849	1.9957
85	− 5.0741	− 4.9436	− 4.8178	2.1977	2.1030	2.0128
84	− 5.0722	− 4.9419	− 4.8162	2.2170	2.1213	2.0300
83	− 5.0700	− 4.9398	− 4.8143	2.2364	2.1396	2.0473
82	− 5.0674	− 4.9373	− 4.8119	2.2559	2.1580	2.0647
81	− 5.0645	− 4.9346	− 4.8093	2.2755	2.1765	2.0822
80	− 5.0612	− 4.9315	− 4.8063	2.2952	2.1952	2.0998
79	− 5.0575	− 4.9280	− 4.8031	2.3151	2.2139	2.1175
78	− 5.0535	− 4.9242	− 4.7994	2.3350	2.2327	2.1353
77	− 5.0490	− 4.9200	− 4.7955	2.3551	2.2517	2.1532
76	− 5.0442	− 4.9154	− 4.7911	2.3753	2.2708	2.1713
75	− 5.0389	− 4.9104	− 4.7864	2.3957	2.2901	2.1895
74	− 5.0332	− 4.9050	− 4.7813	2.4162	2.3095	2.2079
73	− 5.0271	− 4.8992	− 4.7758	2.4369	2.3291	2.2264
72	− 5.0205	− 4.8930	− 4.7700	2.4578	2.3488	2.2450
71	− 5.0135	− 4.8863	− 4.7637	2.4788	2.3687	2.2639
70	− 5.0059	− 4.8792	− 4.7569	2.5001	2.3888	2.2829
69	− 4.9979	− 4.8716	− 4.7497	2.5215	2.4091	2.3021
68	− 4.9894	− 4.8635	− 4.7421	2.5432	2.4296	2.3215
67	− 4.9803	− 4.8549	− 4.7340	2.5650	2.4503	2.3411
66	− 4.9707	− 4.8458	− 4.7253	2.5872	2.4713	2.3610
65	− 4.9605	− 4.8362	− 4.7162	2.6095	2.4925	2.3810
64	− 4.9497	− 4.8259	− 4.7065	2.6322	2.5139	2.4014
63	− 4.9383	− 4.8151	− 4.6962	2.6551	2.5356	2.4219
62	− 4.9262	− 4.8037	− 4.6854	2.6783	2.5576	2.4428
61	− 4.9134	− 4.7916	− 4.6739	2.7018	2.5799	2.4639
60	− 4.8999	− 4.7788	− 4.6618	2.7257	2.6025	2.4854
59	− 4.8857	− 4.7652	− 4.6489	2.7498	2.6255	2.5071
58	− 4.8706	− 4.7510	− 4.6354	2.7744	2.6488	2.5292
57	− 4.8548	− 4.7359	− 4.6211	2.7993	2.6724	2.5517
56	− 4.8380	− 4.7200	− 4.6060	2.8246	2.6965	2.5745
55	− 4.8203	− 4.7032	− 4.5900	2.8504	2.7209	2.5977
54	− 4.8016	− 4.6854	− 4.5730	2.8766	2.7458	2.6213
53	− 4.7819	− 4.6667	− 4.5554	2.9032	2.7711	2.6454
52	− 4.7610	− 4.6469	− 4.5365	2.9304	2.7969	2.6700
51	− 4.7390	− 4.6259	− 4.5166	2.9581	2.8233	2.6950
50	− 4.7157	− 4.6038	− 4.4956	2.9863	2.8501	2.7205
49	− 4.6911	− 4.5804	− 4.4733	3.0152	2.8776	2.7466
48	− 4.6650	− 4.5555	− 4.4497	3.0447	2.9056	2.7733
47	− 4.6374	− 4.5293	− 4.4246	3.0748	2.9343	2.8006
46	− 4.6081	− 4.5014	− 4.3981	3.1057	2.9637	2.8286
45	− 4.5770	− 4.4718	− 4.3699	3.1373	2.9938	2.8573
44	− 4.5440	− 4.4403	− 4.3399	3.1697	3.0247	2.8868
43	− 4.5089	− 4.4068	− 4.3080	3.2030	3.0565	2.9170
42	− 4.4715	− 4.3712	− 4.2740	3.2373	3.0891	2.9482
41	− 4.4317	− 4.3332	− 4.2377	3.2725	3.1228	2.9803

$\phi°$	τ			σ		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
40	1.1845	1.1310	1.0799	7.3688	7.1225	6.8866
39	1.1877	1.1346	1.0839	7.4278	7.1788	6.9404
38	1.1910	1.1384	1.0881	7.4901	7.2384	6.9973
37	1.1944	1.1423	1.0924	7.5561	7.3015	7.0576
36	1.1980	1.1464	1.0970	7.6262	7.3665	7.1217
35	1.2018	1.1507	1.1018	7.7008	7.4399	7.1901
34	1.2057	1.1552	1.1069	7.7805	7.5163	7.2632
33	1.2098	1.1600	1.1122	7.8659	7.5981	7.3417
32	1.2142	1.1651	1.1179	7.9578	7.6863	7.4263
31	1.2188	1.1704	1.1240	8.0572	7.7816	7.5178
30	1.2236	1.1761	1.1305	8.1649	7.8852	7.6173
29	1.2288	1.1823	1.1374	8.2825	7.9983	7.7260
28	1.2344	1.1888	1.1450	8.4115	8.1225	7.8455
27	1.2404	1.1960	1.1532	8.5540	8.2597	7.9778
26	1.2469	1.2038	1.1622	8.7125	8.4127	8.1254
25	1.2539	1.2123	1.1721	8.8905	8.5846	8.2915
24	1.2618	1.2219	1.1832	9.0924	8.7800	8.4806
23	1.2705	1.2328	1.1958	9.3243	9.0048	8.6985
22	1.2804	1.2448	1.2102	9.5951	9.2677	8.9538
21	1.2918	1.2591	1.2271	9.9174	9.5815	9.2593
20	1.3053	1.2761	1.2475	10.3115	9.9663	9.6348
19	1.3219	1.2972	1.2730	10.8117	10.4562	10.1147
18	1.3433	1.3249	1.3068	11.4829	11.1165	10.7643
17	1.3739	1.3650	1.3561	12.4737	12.0974	11.7353
16	1.4271	1.4361	1.4452	14.2702	13.8938	13.5317

$\phi°$	τ			σ		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
90	1.1924	1.1417	1.0931	4.5373	4.4374	4.3404
89	1.1952	1.1446	1.0961	4.5581	4.4574	4.3596
88	1.1981	1.1475	1.0990	4.5791	4.4775	4.3788
87	1.2009	1.1504	1.1020	4.6002	4.4977	4.3981
86	1.2037	1.1533	1.1050	4.6214	4.5180	4.4176
85	1.2066	1.1563	1.1080	4.6428	4.5385	4.4373
84	1.2095	1.1592	1.1111	4.6643	4.5591	4.4570
83	1.2124	1.1622	1.1142	4.6861	4.5799	4.4770
82	1.2153	1.1652	1.1172	4.7080	4.6010	4.4971
81	1.2183	1.1683	1.1204	4.7301	4.6222	4.5175
80	1.2212	1.1713	1.1235	4.7525	4.6436	4.5380
79	1.2242	1.1744	1.1267	4.7751	4.6653	4.5588
78	1.2272	1.1775	1.1299	4.7979	4.6872	4.5799
77	1.2303	1.1807	1.1331	4.8211	4.7095	4.6012
76	1.2334	1.1839	1.1364	4.8446	4.7320	4.6228
75	1.2365	1.1871	1.1397	4.8683	4.7548	4.6448
74	1.2396	1.1903	1.1430	4.8925	4.7780	4.6670
73	1.2428	1.1936	1.1464	4.9170	4.8015	4.6896
72	1.2460	1.1969	1.1498	4.9419	4.8254	4.7126
71	1.2492	1.2003	1.1533	4.9672	4.8498	4.7360

$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
40	− 4.3891	− 4.2925	− 4.1989	3.3089	3.1575	3.0134
39	− 4.3436	− 4.2491	− 4.1574	3.3464	3.1933	3.0476
38	− 4.2948	− 4.2025	− 4.1129	3.3652	3.2303	3.0830
37	− 4.2425	− 4.1524	− 4.0650	3.4253	3.2687	3.1197
36	− 4.1862	− 4.0985	− 4.0135	3.4670	3.3086	3.1579
35	− 4.1254	− 4.0404	− 3.9578	3.5103	3.3501	3.1976
34	− 4.0597	− 3.9775	− 3.6976	3.5555	3.3933	3.2390
33	− 3.9885	− 3.9 92	− 3.8321	3.6036	3.4385	3.2823
32	− 3.9109	− 3.8348	− 3.7608	3.6520	3.4859	3.3277
31	− 3.8263	− 3.7535	− 3.6827	3.7039	3.5357	3.3755
30	− 3.7334	− 3.6643	− 3.5970	3.7586	3.5882	3.4260
29	− 3.6310	− 3.5659	− 3.5024	3.8164	3.6439	3.4795
28	− 3.5177	− 3.4567	− 3.3973	3.8780	3.7031	3.5366
27	− 3.3913	− 3.3350	− 3.2800	3.9437	3.7665	3.5976
36	− 3.2494	− 3.1981	− 3.1479	4.0145	3.8347	3.6635
25	− 3.0888	− 3.0429	− 2.9979	4.0910	3.9087	3.7349
24	− 2.9050	− 2.8651	− 2.8259	4.1747	3.9897	3.8133
23	− 2.6923	− 2.6589	− 2.6260	4.2672	4.0793	3.9001
22	− 2.4422	− 2.4160	− 2.3901	4.3707	4.1798	3.9978
21	− 2.1422	− 2.1240	− 2.1059	4.4888	4.2948	4.1097
20	− 1.7730	− 1.7636	− 1.7541	4.6267	4.4294	4.2411
19	− 1.3015	− 1.3017	− 1.3017	4.7935	4.5927	4.4011
18	− .6648	− .6754	.6855	5.0061	4.8020	4.6069
17	.2803	.2602	.2407	5.3034	5.0963	4.8982
16	2.0034	1.9853	1.9637	5.8118	5.6046	5.4065

$\phi_c = 20°$

$\phi°$	s			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
90	− 3.6835	− 3.6144	− 3.5471	1.9103	1.8511	1.7939
89	− 3.6833	− 3.6142	− 3.5470	1.9312	1.8711	1.8130
88	− 3.6828	− 3.6137	− 3.5465	1.9521	1.8911	1.8322
87	− 3.6819	− 3.6128	− 3.5456	1.9732	1.9113	1.8516
86	− 3.5806	− 3.6116	− 3.5444	1.9944	1.9316	1.8710
85	− 3.6789	− 3.6100	− 3.5439	2.0157	1.9520	1.8906
84	− 3.6768	− 3.6080	− 3.5410	2.0371	1.9726	1.9103
83	− 3.6744	− 3.6056	− 3.5387	2.0587	1.9933	1.9301
82	− 3.6715	− 3.6029	− 3.5361	2.0804	2.0141	1.9501
81	− 3.5682	− 3.5998	− 3.5331	2.1023	2.0351	1.9702
80	− 3.6645	− 3.5962	− 3.5297	2.1244	2.0562	1.9905
79	− 3.6604	− 3.5923	− 3.5259	2.1466	2.0775	2.0109
78	− 3.6559	− 3.5879	− 3.5217	2.1690	2.0990	2.0315
77	− 3.6508	− 3.5831	− 3.5171	2.1916	2.1207	2.0524
76	− 3.6454	− 3.5778	− 3.5121	2.2144	2.1426	2.0734
75	− 3.6394	− 3.5721	− 3.5066	2.2374	2.1647	2.0946
74	− 3.6330	− 3.5659	− 3.5006	2.2607	2.1871	2.1160
73	− 3.6260	− 3.5592	− 3.4942	2.2842	2.2096	2.1377
72	− 3.6185	− 3.5520	− 3.4873	2.3079	2.2324	2.1596
71	− 3.6105	− 3.5443	− 3.4799	2.3330	2.2555	2.1818

$\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
70	1.2525	1.2037	1.1568	4.9930	4.8745	4.7598
69	1.2558	1.2071	1.1603	5.0193	4.8998	4.7840
68	1.2592	1.2106	1.1639	5.0460	4.9255	4.8087
67	1.2626	1.2142	1.1676	5.0733	4.9518	4.8340
66	1.2661	1.2178	1.1713	5.1012	4.9786	4.8598
65	1.2696	1.2214	1.1751	5.1297	5.0060	4.8862
64	1.2732	1.2251	1.1789	5.1589	5.0341	4.9131
63	1.2768	1.2289	1.1828	5.1887	5.0628	4.9408
62	1.2805	1.2328	1.1868	5.2193	5.0922	4.9692
61	1.2842	1.2367	1.1909	5.2507	5.1225	4.9983
60	1.2880	1.2406	1.1950	5.2830	5.1535	5.0282
59	1.2919	1.2447	1.1992	5.3161	5.1855	5.0589
58	1.2959	1.2489	1.2035	5.3502	5.2183	5.0906
57	1.2999	1.2531	1.2080	5.3854	5.2522	5.1233
56	1.3040	1.2574	1.2125	5.4216	5.2872	5.1570
55	1.3083	1.2618	1.2171	5.4591	5.3233	5.1918
54	1.3126	1.2664	1.2218	5.4978	5.3607	5.2279
53	1.3170	1.2710	1.2267	5.5380	5.3994	5.2652
52	1.3215	1.2758	1.2317	5.5795	5.4395	5.3040
51	1.3262	1.2807	1.2368	5.6227	5.4812	5.3442
50	1.3309	1.2857	1.2421	5.6677	5.5246	5.3861
49	1.3358	1.2909	1.2475	5.7145	5.5698	5.4298
48	1.3409	1.2963	1.2531	5.7633	5.6170	5.4754
47	1.3460	1.3018	1.2590	5.8143	5.6664	5.5232
46	1.3514	1.3075	1.2650	5.8678	5.7181	5.5732
45	1.3569	1.3134	1.2712	5.9239	5.7724	5.6257
44	1.3627	1.3195	1.2777	5.9828	5.8295	5.6810
43	1.3686	1.3259	1.2844	6.0450	5.8897	5.7393
42	1.3748	1.3325	1.2915	6.1107	5.9533	5.8009
41	1.3812	1.3394	1.2988	6.1802	6.0207	5.8663
40	1.3880	1.3466	1.3065	6.2541	6.0924	5.9358
39	1.3950	1.3542	1.3146	6.3329	6.1688	6.0100
38	1.4023	1.3622	1.3232	6.4170	6.2506	6.0894
37	1.4101	1.3706	1.3322	6.5074	6.3383	6.1747
36	1.4183	1.3795	1.3417	6.6047	6.4329	6.2666
35	1.4269	1.3889	1.3519	6.7100	6.5354	6.3664
34	1.4362	1.3990	1.3629	6.8245	6.6449	6.4750
33	1.4460	1.4099	1.3746	6.9498	6.7691	6.5940
32	1.4566	1.4216	1.3873	7.0878	6.9037	6.7253
31	1.4681	1.4343	1.4012	7.2409	7.0531	6.8712
30	1.4806	1.4482	1.4164	7.4122	7.2206	7.0349
29	1.4944	1.4636	1.4334	7.6060	7.4103	7.2205
28	1.5098	1.4809	1.4524	7.8279	7.6278	7.4337
27	1.5273	1.5005	1.4742	8.0862	7.8813	7.6826
26	1.5474	1.5233	1.4996	8.3929	8.1829	7.9792
25	1.5711	1.5504	1.5299	8.7669	8.5516	8.3426
24	1.6003	1.5839	1.5677	9.2406	9.0197	8.8052
23	1.6381	1.6277	1.6174	9.8755	9.6494	9.4297
22	1.6921	1.6908	1.6896	10.8132	10.5838	10.3607
21	1.7869	1.8032	1.8196	12.5214	12.2991	12.0834

$\phi°$	ζ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
70	- 3.6019	- 3.5360	- 3.4719	2.3563	2.2789	2.2042
69	- 3.5927	- 3.5272	- 3.4634	2.3809	2.3025	2.2269
68	- 3.5829	- 3.5178	- 3.4544	2.4058	2.3264	2.2500
67	- 3.5724	- 3.5077	- 3.4447	2.4310	2.3507	2.2733
66	- 3.5613	- 3.4970	- 3.4344	2.4566	2.3753	2.2969
65	- 3.5495	- 3.4857	- 3.4235	2.4825	2.4002	2.3209
64	- 3.5369	- 3.4736	- 3.4119	2.5088	2.4256	2.3453
63	- 3.5236	- 3.4608	- 3.3995	2.5355	2.4513	2.3700
62	- 3.5095	- 3.4472	- 3.3864	2.5627	2.4774	2.3952
61	- 3.4945	- 3.4327	- 3.3726	2.5903	2.5040	2.4208
60	- 3.4786	- 3.4174	- 3.3578	2.6183	2.5310	2.4468
59	- 3.4618	- 3.4012	- 3.3423	2.6469	2.5585	2.4733
58	- 3.4440	- 3.3841	- 3.3257	2.6760	2.5865	2.5003
57	- 3.4251	- 3.3659	- 3.3081	2.7056	2.6151	2.5279
56	- 3.4050	- 3.3465	- 3.2895	2.7359	2.6443	2.5560
55	- 3.3838	- 3.3261	- 3.2698	2.7667	2.6740	2.5847
54	- 3.3613	- 3.3044	- 3.2488	2.7983	2.7044	2.6140
53	- 3.3375	- 3.2814	- 3.2266	2.8305	2.7356	2.6440
52	- 3.3121	- 3.2569	- 3.2030	2.8635	2.7674	2.6748
51	- 3.2853	- 3.2310	- 3.1780	2.8973	2.8000	2.7063
50	- 3.2567	- 3.2034	- 3.1513	2.9320	2.8335	2.7386
49	- 3.2263	- 3.1740	- 3.1229	2.9675	2.8679	2.7719
48	- 3.1939	- 3.1427	- 3.0927	3.0041	2.9032	2.8060
47	- 3.1594	- 3.1094	- 3.0605	3.0417	2.9396	2.8412
46	- 3.1227	- 3.0738	- 3.0260	3.0805	2.9771	2.8775
45	- 3.0833	- 3.0357	- 2.9892	3.1205	3.0158	2.9149
44	- 3.0413	- 2.9950	- 2.9498	3.1618	3.0559	2.9537
43	- 2.9963	- 2.9513	- 2.9075	3.2046	3.0973	2.9938
42	- 2.9478	- 2.9044	- 2.8620	3.2490	3.1403	3.0355
41	- 2.8957	- 2.8539	- 2.8131	3.2951	3.1850	3.0788
40	- 2.8395	- 2.7994	- 2.7602	3.3431	3.2315	3.1239
39	- 2.7787	- 2.7404	- 2.7030	3.3931	3.2801	3.1711
38	- 2.7128	- 2.6765	- 2.6408	3.4455	3.3310	3.2205
37	- 2.6412	- 2.6068	- 2.5732	3.5005	3.3844	3.2724
36	- 2.5629	- 2.5308	- 2.4992	3.5584	3.4407	3.3271
35	- 2.4772	- 2.4473	- 2.4180	3.6195	3.5002	3.3850
34	- 2.3828	- 2.3554	- 2.3285	3.6844	3.5633	3.4465
33	- 2.2783	- 2.2536	- 2.2293	3.7535	3.6307	3.5122
32	- 2.1619	- 2.1400	- 2.1185	3.8276	3.7030	3.5827
31	- 2.0314	- 2.0126	- 1.9941	3.9076	3.7811	3.6589
30	- 1.8837	- 1.8683	- 1.8530	3.9945	3.8661	3.7420
29	- 1.7151	- 1.7032	- 1.6915	4.0899	3.9594	3.8334
28	- 1.5200	- 1.5120	- 1.5041	4.1958	4.0632	3.9350
27	- 1.2909	- 1.2871	- 1.2833	4.3150	4.1802	4.0499
26	- 1.0164	- 1.0171	- 1.0178	4.4517	4.3147	4.1822
25	- .6787	- .6843	- .6899	4.6127	4.4733	4.3385
24	- .2476	- .2583	- .2688	4.8089	4.6673	4.5303
23	.3347	.3192	.3040	5.0618	4.9180	4.7789
22	1.2013	1.1837	1.1644	5.4201	5.2750	5.1346
21	2.7912	2.7794	2.7679	6.0444	5.9019	5.7641

$$\phi_c = 25°$$

$\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
90	1.3112	1.2671	1.2245	3.6958	3.6306	3.5670
89	1.3159	1.2719	1.2294	3.7188	3.6528	3.5884
88	1.3207	1.2768	1.2343	3.7420	3.6752	3.6100
87	1.3255	1.2817	1.2393	3.7653	3.6978	3.6319
86	1.3304	1.2866	1.2443	3.7888	3.7205	3.6539
85	1.3353	1.2916	1.2493	3.8126	3.7435	3.6761
84	1.3403	1.2966	1.2544	3.8366	3.7668	3.6986
83	1.3453	1.3017	1.2595	3.8609	3.7903	3.7213
82	1.3503	1.3068	1.2647	3.8855	3.8141	3.7443
81	1.3554	1.3120	1.2699	3.9104	3.8381	3.7677
80	1.3606	1.3172	1.2752	3.9356	3.8625	3.7913
79	1.3658	1.3225	1.2806	3.9611	3.8873	3.8152
78	1.3710	1.3279	1.2860	3.9871	3.9124	3.8396
77	1.3764	1.3333	1.2915	4.0134	3.9379	3.8643
76	1.3818	1.3388	1.2971	4.0402	3.9638	3.8894
75	1.3872	1.3443	1.3027	4.0674	3.9902	3.9149
74	1.3928	1.3500	1.3085	4.0951	4.0170	3.9410
73	1.3984	1.3557	1.3143	4.1233	4.0444	3.9675
72	1.4041	1.3615	1.3202	4.1521	4.0723	3.9945
71	1.4099	1.3674	1.3261	4.1814	4.1007	4.0221
70	1.4157	1.3733	1.3322	4.2114	4.1298	4.0503
69	1.4217	1.3794	1.3384	4.2420	4.1595	4.0791
68	1.4277	1.3856	1.3447	4.2734	4.1899	4.1086
67	1.4339	1.3919	1.3511	4.3055	4.2211	4.1389
66	1.4402	1.3983	1.3577	4.3383	4.2530	4.1699
65	1.4466	1.4048	1.3643	4.3721	4.2858	4.2017
64	1.4531	1.4115	1.3711	4.4068	4.3195	4.2344
63	1.4597	1.4183	1.3781	4.4424	4.3541	4.2681
62	1.4665	1.4253	1.3852	4.4791	4.3898	4.3027
61	1.4734	1.4324	1.3924	4.5170	4.4266	4.3385
60	1.4805	1.4396	1.3999	4.5560	4.4645	4.3754
59	1.4878	1.4471	1.4075	4.5963	4.5037	4.4135
58	1.4952	1.4547	1.4153	4.6380	4.5443	4.4530
57	1.5028	1.4625	1.4233	4.6813	4.5864	4.4939
56	1.5106	1.4706	1.4316	4.7261	4.6300	4.5364
55	1.5187	1.4788	1.4401	4.7727	4.6754	4.5805
54	1.5269	1.4874	1.4488	4.8212	4.7226	4.6265
53	1.5354	1.4961	1.4579	4.8717	4.7718	4.6745
52	1.5442	1.5052	1.4672	4.9244	4.8232	4.7246
51	1.5533	1.5146	1.4769	4.9796	4.8770	4.7771
50	1.5626	1.5243	1.4869	5.0375	4.9334	4.8321
49	1.5724	1.5344	1.4973	5.0983	4.9927	4.8899
48	1.5824	1.5448	1.5081	5.1623	5.0552	4.9509
47	1.5929	1.5557	1.5194	5.2298	5.1211	5.0153
46	1.6039	1.5671	1.5312	5.3012	5.1909	5.0835

$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
90	− 2.8443	− 2.8029	− 2.7623	1.7665	1.7239	1.5824
89	− 2.8441	− 2.8027	− 2.7621	1.7895	1.7461	1.7038
88	− 2.8435	− 2.8021	− 2.7615	1.8126	1.7684	1.7255
87	− 2.8423	− 2.8011	− 2.7606	1.8359	1.7910	1.7473
86	− 2.8410	− 2.7998	− 2.7593	1.8594	1.8137	1.7692
85	− 2.8392	− 2.7980	− 2.7575	1.8831	1.8366	1.7914
84	− 2.8369	− 2.7957	− 2.7553	1.9070	1.8598	1.8138
83	− 2.8341	− 2.7931	− 2.7528	1.9312	1.8831	1.8364
82	− 2.8309	− 2.7900	− 2.7498	1.9555	1.9067	1.8592
81	− 2.8272	− 2.7864	− 2.7463	1.9801	1.9305	1.8822
80	− 2.8231	− 2.7824	− 2.7424	2.0050	1.9546	1.9055
79	− 2.8184	− 2.7779	− 2.7380	2.0301	1.9789	1.9291
78	− 2.8132	− 2.7729	− 2.7332	2.0555	2.0035	1.9529
77	− 2.8075	− 2.7673	− 2.7278	2.0812	2.0284	1.9771
76	− 2.8013	− 2.7613	− 2.7220	2.1073	2.0536	2.0015
75	− 2.7945	− 2.7547	− 2.7156	2.1336	2.0792	2.0262
74	− 2.7871	− 2.7475	− 2.7086	2.1603	2.1050	2.0513
73	− 2.7791	− 2.7397	− 2.7011	2.1873	2.1312	2.0767
72	− 2.7704	− 2.7314	− 2.6930	2.2148	2.1578	2.1025
71	− 2.7611	− 2.7223	− 2.6842	2.2426	2.1848	2.1287
70	− 2.7511	− 2.7126	− 2.6748	2.2709	2.2122	2.1552
69	− 2.7404	− 2.7022	− 2.6647	2.2995	2.2401	2.1822
68	− 2.7289	− 2.6911	− 2.6539	2.3287	2.2684	2.2097
67	− 2.7166	− 2.6791	− 2.6423	2.3584	2.2971	2.2376
66	− 2.7035	− 2.6664	− 2.6300	2.3885	2.3264	2.2661
65	− 2.6895	− 2.6528	− 2.6168	2.4192	2.3563	2.2950
64	− 2.6746	− 2.6383	− 2.6027	2.4505	2.3867	2.3246
63	− 2.6586	− 2.6228	− 2.5877	2.4824	2.4177	2.3547
62	− 2.6417	− 2.6064	− 2.5716	2.5150	2.4493	2.3854
61	− 2.6236	− 2.5888	− 2.5546	2.5482	2.4816	2.4168
60	− 2.6044	− 2.5701	− 2.5364	2.5822	2.5146	2.4489
59	− 2.5840	− 2.5502	− 2.5171	2.6170	2.5484	2.4818
58	− 2.5622	− 2.5290	− 2.4964	2.6525	2.5830	2.5155
57	− 2.5389	− 2.5064	− 2.4744	2.6890	2.6185	2.5500
56	− 2.5142	− 2.4823	− 2.4510	2.7264	2.6549	2.5854
55	− 2.4878	− 2.4567	− 2.4260	2.7648	2.6923	2.6218
54	− 2.4596	− 2.4292	− 2.3993	2.8042	2.7307	2.6592
53	− 2.4296	− 2.4000	− 2.3708	2.8448	2.7703	2.6978
52	− 2.3975	− 2.3687	− 2.3402	2.8867	2.8110	2.7375
51	− 2.3631	− 2.3352	− 2.3076	2.9299	2.8532	2.7786
50	− 2.3263	− 2.2993	− 2.2726	2.9745	2.8967	2.8210
49	− 2.2868	− 2.2607	− 2.2350	3.0207	2.9418	2.8650
48	− 2.2444	− 2.2194	− 2.1946	3.0687	2.9885	2.9107
47	− 2.1988	− 2.1748	− 2.1511	3.1184	3.0371	2.9581
46	− 2.1496	− 2.1268	− 2.1042	3.1703	3.0878	3.0076

$\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
45	1.6153	1.5790	1.5435	5.3771	5.2650	5.1559
44	1.6272	1.5915	1.5565	5.4578	5.3439	5.2330
43	1.6398	1.6046	1.5702	5.5440	5.4283	5.3155
42	1.6530	1.6184	1.5846	5.6363	5.5187	5.4040
41	1.6670	1.6331	1.5999	5.7358	5.6161	5.4994
40	1.6818	1.6487	1.6162	5.8433	5.7214	5.6027
39	1.6976	1.6654	1.6337	5.9601	5.8360	5.7150
38	1.7146	1.6832	1.6525	6.0878	5.9613	5.8380
37	1.7328	1.7025	1.6728	6.2284	6.0993	5.9736
36	1.7526	1.7235	1.6949	6.3841	6.2525	6.1241
35	1.7743	1.7466	1.7193	6.5584	6.4239	6.2928
34	1.7983	1.7721	1.7464	6.7554	6.6180	6.4839
33	1.8251	1.8008	1.7768	6.9811	6.8405	6.7033
32	1.8555	1.8334	1.8116	7.2437	7.0998	6.9594
31	1.8907	1.8714	1.8522	7.5558	7.4085	7.2646
30	1.9327	1.9167	1.9008	7.9370	7.7861	7.6387
29	1.9844	1.9729	1.9614	8.4208	8.2666	8.1158
28	2.0521	2.0467	2.0414	9.0719	8.9149	8.7614
27	2.1498	2.1540	2.1583	10.0401	9.8828	9.7290
26	2.3244	2.3477	2.3713	11.8272	11.6807	11.5379

$\phi_c = 30°$

$\phi°$	$\dot\tau$			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
90	1.4462	1.4064	1.3678	3.1343	3.0884	3.0433
89	1.4538	1.4141	1.3754	3.1597	3.1130	3.0673
88	1.4614	1.4218	1.3832	3.1853	3.1380	3.0916
87	1.4692	1.4296	1.3910	3.2113	3.1632	3.1161
86	1.4770	1.4374	1.3989	3.2376	3.1888	3.1410
85	1.4849	1.4454	1.4069	3.2642	3.2147	3.1662
84	1.4930	1.4535	1.4150	3.2912	3.2410	3.1918
83	1.5011	1.4617	1.4233	3.3185	3.2676	3.2177
82	1.5093	1.4699	1.4316	3.3463	3.2947	3.2441
81	1.5177	1.4783	1.4400	3.3746	3.3222	3.2709
80	1.5261	1.4869	1.4486	3.4053	3.3502	3.2981
79	1.5347	1.4955	1.4573	3.4325	3.3786	3.3259
78	1.5434	1.5043	1.4662	3.4623	3.4076	3.3541
77	1.5523	1.5132	1.4751	3.4926	3.4372	3.3829
76	1.5613	1.5223	1.4843	3.5235	3.4674	3.4124
75	1.5704	1.5315	1.4936	3.5551	3.4982	3.4424
74	1.5797	1.5409	1.5030	3.5874	3.5297	3.4731
73	1.5892	1.5505	1.5127	3.6204	3.5619	3.5045
72	1.5989	1.5602	1.5225	3.6543	3.5949	3.5367
71	1.6087	1.5702	1.5325	3.6889	3.6287	3.5698
70	1.6187	1.5803	1.5428	3.7245	3.6634	3.6036
69	1.6290	1.5906	1.5532	3.7610	3.6991	3.6384
68	1.6394	1.6012	1.5639	3.7985	3.7357	3.6742
67	1.6501	1.6120	1.5749	3.8371	3.7735	3.7111
66	1.6610	1.6231	1.5861	3.8770	3.8124	3.7491

Table 4

$\phi_c = 25°$ (continued)

$\phi°$	ξ			η		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
45	- 2.0965	- 2.0748	- 2.0534	3.2243	3.1406	3.0592
44	- 2.0389	- 2.0185	- 1.9984	3.2809	3.1959	3.1133
43	- 1.9764	- 1.9574	- 1.9385	3.3402	3.2540	3.1701
42	- 1.9082	- 1.8907	- 1.8733	3.4026	3.3150	3.2299
41	- 1.8338	- 1.8177	- 1.8018	3.4685	3.3796	3.2931
40	- 1.7520	- 1.7376	- 1.7233	3.5383	3.4480	3.3601
39	- 1.6616	- 1.6493	- 1.6366	3.6126	3.5209	3.4316
38	- 1.5619	- 1.5511	- 1.5403	3.6921	3.5989	3.5081
37	- 1.4504	- 1.4416	- 1.4328	3.7776	3.6828	3.5906
36	- 1.3252	- 1.3185	- 1.3118	3.8703	3.7739	3.6801
35	- 1.1833	- 1.1789	- 1.1745	3.9714	3.8734	3.7780
34	- 1.0209	- 1.0190	- 1.0169	4.0830	3.9833	3.8863
33	- .8327	- .8334	- .8339	4.2075	4.1061	4.0073
32	- .6111	- .6146	- .6179	4.3486	4.2454	4.1449
31	- .3450	- .3514	- .3576	4.5116	4.4066	4.3043
30	- .0165	- .0260	- .0352	4.7049	4.5982	4.4941
29	.4047	.3923	.3801	4.9430	4.8346	4.7288
28	.9770	.9622	.9476	5.2534	5.1437	5.0366
27	1.8361	1.8210	1.8062	5.6999	5.5900	5.4828
26	3.4363	3.4309	3.4259	6.4955	6.3904	6.2880

$\phi_c = 30°$

$\phi°$	ξ			η		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
90	- 2.2845	- 2.2576	- 2.2313	1.6843	1.6330	1.5903
89	- 2.2843	- 2.2574	- 2.2311	1.6797	1.6466	1.6143
88	- 2.2837	- 2.2567	- 2.2305	1.7053	1.6716	1.6386
87	- 2.2825	- 2.2556	- 2.2294	1.7312	1.6968	1.6631
86	- 2.2809	- 2.2540	- 2.2279	1.7575	1.7223	1.6880
85	- 2.2788	- 2.2520	- 2.2259	1.7840	1.7482	1.7131
84	- 2.2762	- 2.2495	- 2.2235	1.8109	1.7743	1.7385
83	- 2.2731	- 2.2465	- 2.2205	1.8380	1.8008	1.7643
82	- 2.2695	- 2.2439	- 2.2171	1.8656	1.8276	1.7905
81	- 2.2653	- 2.2389	- 2.2131	1.8935	1.8548	1.8170
80	- 2.2606	- 2.2343	- 2.2086	1.9218	1.8824	1.8438
79	- 2.2553	- 2.2291	- 2.2036	1.9506	1.9104	1.8711
78	- 2.2493	- 2.2233	- 2.1979	1.9797	1.9388	1.8988
77	- 2.2428	- 2.2169	- 2.1917	2.0093	1.9677	1.9269
76	- 2.2355	- 2.2098	- 2.1848	2.0394	1.9970	1.9555
75	- 2.2276	- 2.2021	- 2.1773	2.0700	2.0268	1.9846
74	- 2.2190	- 2.1937	- 2.1691	2.1011	2.0572	2.0142
73	- 2.2096	- 2.1846	- 2.1602	2.1328	2.0881	2.0443
72	- 2.1994	- 2.1746	- 2.1505	2.1651	2.1195	2.0750
71	- 2.1885	- 2.1639	- 2.1400	2.1979	2.1516	2.1064
70	- 2.1766	- 2.1523	- 2.1287	2.2314	2.1843	2.1383
69	- 2.1638	- 2.1398	- 2.1165	2.2656	2.2177	2.1709
68	- 2.1500	- 2.1264	- 2.1034	2.3006	2.2518	2.2042
67	- 2.1352	- 2.1119	- 2.0893	2.3363	2.2867	2.2383
66	- 2.1194	- 2.0964	- 2.0741	2.3728	2.3224	2.2731

$\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
65	1.6722	1.6345	1.5975	3.9180	3.8525	3.7883
64	1.6837	1.6461	1.6093	3.9605	3.8940	3.8289
63	1.6955	1.6580	1.6214	4.0043	3.9369	3.8708
62	1.7076	1.6703	1.6339	4.0498	3.9813	3.9143
61	1.7200	1.6829	1.6467	4.0969	4.0274	3.9594
60	1.7328	1.6959	1.6598	4.1459	4.0754	4.0063
59	1.7460	1.7093	1.6735	4.1968	4.1252	4.0551
58	1.7596	1.7232	1.6875	4.2499	4.1772	4.1060
57	1.7736	1.7375	1.7021	4.3054	4.2315	4.1592
56	1.7882	1.7523	1.7171	4.3634	4.2884	4.2149
55	1.8032	1.7677	1.7328	4.4242	4.3479	4.2733
54	1.8189	1.7836	1.7490	4.4880	4.4105	4.3347
53	1.8352	1.8002	1.7660	4.5552	4.4765	4.3993
52	1.8521	1.8176	1.7837	4.6262	4.5461	4.4676
51	1.8698	1.8357	1.8022	4.7012	4.6197	4.5399
50	1.8884	1.8547	1.8216	4.7809	4.6980	4.6168
49	1.9078	1.8746	1.8420	4.8657	4.7813	4.6986
48	1.9283	1.8956	1.8635	4.9563	4.8703	4.7861
47	1.9500	1.9179	1.8863	5.0534	4.9658	4.8800
46	1.9729	1.9415	1.9106	5.1580	5.0687	4.9812
45	1.9973	1.9666	1.9364	5.2711	5.1801	5.0908
44	2.0234	1.9936	1.9642	5.3941	5.3012	5.2102
43	2.0515	2.0226	1.9940	5.5287	5.4338	5.3409
42	2.0819	2.0540	2.0265	5.6768	5.5799	5.4850
41	2.1150	2.0883	2.0619	5.8413	5.7423	5.6452
40	2.1513	2.1260	2.1010	6.0255	5.9242	5.8249
39	2.1917	2.1680	2.1445	6.2341	6.1305	6.0289
38	2.2371	2.2153	2.1937	6.4736	6.3675	6.2634
37	2.2890	2.2695	2.2502	6.7530	6.6444	6.5378
36	2.3495	2.3329	2.3163	7.0862	6.9749	6.8657
35	2.4221	2.4090	2.3960	7.4948	7.3809	7.2693
34	2.5126	2.5043	2.4960	8.0164	7.9003	7.7864
33	2.6323	2.6308	2.6294	8.7238	8.6064	8.4911
32	2.8078	2.8172	2.8267	9.7880	9.6721	9.5583
31	3.1296	3.1614	3.1936	11.7928	11.6905	11.5905

$\phi_c = 35°$

$\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
90	1.6007	1.5639	1.5279	2.7330	2.6988	2.6652
89	1.6123	1.5755	1.5395	2.7611	2.7263	2.6921
88	1.6241	1.5872	1.5512	2.7897	2.7542	2.7194
87	1.6360	1.5992	1.5632	2.8187	2.7826	2.7471
86	1.6481	1.6113	1.5753	2.8482	2.8114	2.7753
85	1.6604	1.6237	1.5877	2.8782	2.8406	2.8040
84	1.6730	1.6362	1.6002	2.9087	2.8706	2.8332
83	1.6857	1.6489	1.6130	2.9398	2.9011	2.8630
82	1.6986	1.6619	1.6260	2.9716	2.9321	2.8933
81	1.7118	1.6752	1.6393	3.0040	2.9638	2.9243

$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
65	- 2.1023	- 2.0798	- 2.0579	2.4101	2.3589	2.3088
64	- 2.0841	- 2.0619	- 2.0404	2.4484	2.3963	2.3454
63	- 2.0645	- 2.0428	- 2.0217	2.4877	2.4347	2.3829
62	- 2.0435	- 2.0223	- 2.0016	2.5280	2.4741	2.4215
61	- 2.0210	- 2.0002	- 1.9801	2.5394	2.5147	2.4611
60	- 1.9969	- 1.9767	- 1.9570	2.6120	2.5564	2.5020
59	- 1.9710	- 1.9513	- 1.9322	2.6559	2.5993	2.5440
58	- 1.9433	- 1.9242	- 1.9056	2.7012	2.6437	2.5874
57	- 1.9135	- 1.8950	- 1.8770	2.7480	2.6895	2.6323
56	- 1.8815	- 1.8636	- 1.8463	2.7963	2.7369	2.6787
55	- 1.8470	- 1.8299	- 1.8132	2.8464	2.7860	2.7268
54	- 1.8100	- 1.7935	- 1.7776	2.8984	2.8369	2.7768
53	- 1.7700	- 1.7543	- 1.7391	2.9524	2.8899	2.8288
52	- 1.7268	- 1.7119	- 1.6975	3.0087	2.9451	2.8829
51	- 1.6801	- 1.6661	- 1.6525	3.0675	3.0028	2.9395
50	- 1.6294	- 1.6163	- 1.6036	3.1289	3.0631	2.9988
49	- 1.5743	- 1.5622	- 1.5505	3.1934	3.1265	3.0610
48	- 1.5143	- 1.5032	- 1.4925	3.2612	3.1931	3.1265
47	- 1.4486	- 1.4387	- 1.4290	3.3328	3.2636	3.1958
46	- 1.3766	- 1.3678	- 1.3594	3.4087	3.3382	3.2692
45	- 1.2973	- 1.2898	- 1.2825	3.4894	3.4176	3.3474
44	- 1.2096	- 1.2033	- 1.1974	3.5756	3.5025	3.4310
43	- 1.1120	- 1.1071	- 1.1026	3.6682	3.5938	3.5209
42	- 1.0027	- .9994	- .9963	3.7683	3.6925	3.6183
41	- .8796	- .8778	- .8763	3.8772	3.8000	3.7244
40	- .7395	- .7394	- .7396	3.9968	3.9182	3.8411
39	- .5784	- .5802	- .5822	4.1295	4.0493	3.9708
38	- .3910	- .3947	- .3986	4.2785	4.1968	4.1168
37	- .1693	- .1750	- .1809	4.4486	4.3653	4.2838
36	.0986	.0907	.0827	4.6467	4.5619	4.4788
35	.4313	.4213	.4113	4.8838	4.7975	4.7130
34	.8613	.8495	.8376	5.1791	5.0915	5.0057
33	1.4514	1.4384	1.4254	5.5693	5.4809	5.3944
32	2.3493	2.3377	2.3259	6.1404	6.0529	5.9671
31	4.0598	4.0598	4.0599	7.1859	7.1055	7.0269

$\phi_c = 35°$

$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
90	- 1.8838	- 1.8655	- 1.8475	1.5639	1.5384	1.5134
89	- 1.8835	- 1.8652	- 1.8473	1.5920	1.5659	1.5403
88	- 1.8828	- 1.8645	- 1.8466	1.6206	1.5938	1.5676
87	- 1.8815	- 1.8633	- 1.8454	1.6495	1.6221	1.5953
86	- 1.8797	- 1.8615	- 1.8437	1.6790	1.6509	1.6234
85	- 1.8774	- 1.8592	- 1.8414	1.7089	1.6802	1.6520
84	- 1.8744	- 1.8563	- 1.8386	1.7393	1.7099	1.6811
83	- 1.8709	- 1.8529	- 1.8352	1.7702	1.7402	1.7106
82	- 1.8668	- 1.8488	- 1.8313	1.8017	1.7709	1.7408
81	- 1.8620	- 1.8441	- 1.8267	1.8337	1.8023	1.7714

$\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0\ 02$	$f = 0.03$
80	1.7253	1.6886	1.6528	3.0371	2.9962	2.9560
79	1.7390	1.7024	1.6665	3.0709	3.0293	2.9885
78	1.7529	1.7164	1.6806	3.1055	3.0632	3.0216
77	1.7672	1.7307	1.6950	3.1410	3.0980	3.0557
76	1.7818	1.7453	1.7096	3.1774	3.1336	3.0905
75	1.7967	1.7603	1.7246	3.2147	3.1701	3.1264
74	1.8119	1.7756	1.7400	3.2530	3.2077	3.1632
73	1.8275	1.7912	1.7557	3.2925	3.2464	3.2011
72	1.8434	1.8073	1.7718	3.3331	3.2862	3.2401
71	1.8598	1.8237	1.7884	3.3749	3.3272	3.2803
70	1.8766	1.8406	1.8053	3.4182	3.3696	3.3219
69	1.8938	1.8580	1.8228	3.4628	3.4134	3.3649
68	1.9116	1.8758	1.8408	3.5091	3.4588	3.4094
67	1.9298	1.8942	1.8593	3.5570	3.5058	3.4555
66	1.9486	1.9132	1.8784	3.6067	3.5546	3.5034
65	1.9680	1.9327	1.8981	3.6584	3.6053	3.5533
64	1.9881	1.9529	1.9184	3.7122	3.6582	3.6052
63	2.0088	1.9739	1.9395	3.7683	3.7133	3.6593
62	2.0303	1.9955	1.9614	3.8269	3.7709	3.7159
61	2.0525	2.0180	1.9841	3.8882	3.8312	3.7752
60	2.0757	2.0414	2.0077	3.9526	3.8945	3.8375
59	2.0998	2.0658	2.0323	4.0203	3.9611	3.9030
58	2.1249	2.0912	2.0580	4.0916	4.0313	3.9720
57	2.1512	2.1178	2.0849	4.1669	4.1054	4.0450
56	2.1787	2.1457	2.1132	4.2467	4.1840	4.1223
55	2.2076	2.1750	2.1429	4.3314	4.2674	4.2046
54	2.2380	2.2059	2.1742	4.4218	4.3565	4.2923
53	2.2702	2.2395	2.2073	4.5184	4.4517	4.3862
52	2.3043	2.2732	2.2425	4.6221	4.5540	4.4871
51	2.3405	2.3101	2.2800	4.7340	4.6644	4.5960
50	2.3793	2.3495	2.3201	4.8552	4.7841	4.7141
49	2.4209	2.3920	2.3633	4.9872	4.9145	4.8430
48	2.4659	2.4378	2.4101	5.1320	5.0575	4.9843
47	2.5148	2.4878	2.4610	5.2917	5.2155	5.1406
46	2.5684	2.5425	2.5170	5.4695	5.3914	5.3146
45	2.6276	2.6031	2.5789	5.6692	5.5892	5.5105
44	2.6937	2.6709	2.6484	5.8961	5.8141	5.7334
43	2.7686	2.7478	2.7272	6.1576	6.0735	5.9908
42	2.8548	2.8365	2.8183	6.4642	6.3780	6.2931
41	2.9562	2.9410	2.9258	6.8317	6.7433	6.6563
40	3.0791	3.0678	3.0566	7.2855	7.1952	7.1062
39	3.2341	3.2282	3.2224	7.8697	7.7778	7.6872
38	3.4423	3.4443	3.4463	8.6710	8.5786	8.4875
37	3.7537	3.7687	3.7838	9.8958	9.8062	9.7179
36	4.3426	4.3856	4.4290	12.2654	12.1924	12.1209

$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
80	- 1.8565	- 1.8388	- 1.8215	1.8664	1.8342	1.8027
79	- 1.8503	- 1.8328	- 1.8155	1.8996	1.8668	1.8346
78	- 1.8434	- 1.8260	- 1.8089	1.9336	1.9000	1.8671
77	- 1.8358	- 1.8185	- 1.8016	1.9682	1.9339	1.9003
76	- 1.8273	- 1.8102	- 1.7934	2.0035	1.9685	1.9342
75	- 1.8179	- 1.8010	- 1.7845	2.0397	2.0039	1.9689
74	- 1.8077	- 1.7910	- 1.7746	2.0766	2.0401	2.0044
73	- 1.7965	- 1.7800	- 1.7639	2.1144	2.0772	2.0407
72	- 1.7843	- 1.7680	- 1.7521	2.1532	2.1152	2.0779
71	- 1.7710	- 1.7550	- 1.7393	2.1929	2.1541	2.1161
70	- 1.7566	- 1.7408	- 1.7255	2.2336	2.1941	2.1553
69	- 1.7409	- 1.7255	- 1.7104	2.2754	2.2351	2.1955
68	- 1.7240	- 1.7089	- 1.6941	2.3184	2.2773	2.2369
67	- 1.7056	- 1.6909	- 1.6764	2.3627	2.3207	2.2795
66	- 1.6858	- 1.6714	- 1.6573	2.4083	2.3655	2.3235
65	- 1.6644	- 1.6504	- 1.6367	2.4553	2.4117	2.3688
64	- 1.6412	- 1.6276	- 1.6143	2.5039	2.4593	2.4157
63	- 1.6162	- 1.6030	- 1.5902	2.5541	2.5087	2.4641
62	- 1.5891	- 1.5764	- 1.5640	2.6061	2.5598	2.5144
61	- 1.5598	- 1.5476	- 1.5357	2.6600	2.6128	2.5665
60	- 1.5281	- 1.5164	- 1.5051	2.7160	2.6679	2.6206
59	- 1.4938	- 1.4827	- 1.4718	2.7743	2.7252	2.6770
58	- 1.4565	- 1.4460	- 1.4358	2.8351	2.7850	2.7359
57	- 1.4160	- 1.4062	- 1.3965	2.8986	2.8476	2.7974
56	- 1.3720	- 1.3628	- 1.3538	2.9652	2.9131	2.8619
55	- 1.3240	- 1.3155	- 1.3073	3.0350	2.9819	2.9297
54	- 1.2715	- 1.2638	- 1.2563	3.1085	3.0543	3.0011
53	- 1.2140	- 1.2071	- 1.2004	3.1862	3.1309	3.0766
52	- 1.1509	- 1.1448	- 1.1390	3.2685	3.2121	3.1567
51	- 1.0812	- 1.0761	- 1.0712	3.3560	3.2984	3.2419
50	- 1.0041	- 1.0000	- .9960	3.4496	3.3908	3.3330
49	- .9184	- .9153	- .9124	3.5499	3.4899	3.4310
48	- .8224	- .8205	- .8187	3.6583	3.5970	3.5368
47	- .7145	- .7137	- .7131	3.7761	3.7135	3.6520
46	- .5921	- .5926	- .5933	3.9050	3.8411	3.7783
45	- .4521	- .4540	- .4560	4.0474	3.9821	3.9179
44	- .2902	- .2935	- .2969	4.2064	4.1397	4.0742
43	- .1005	- .1053	- .1103	4.3864	4.3182	4.2512
42	.1256	.1192	.1127	4.5935	4.5239	4.4554
41	.4009	.3929	.3848	4.8369	4.7659	4.6960
40	.7460	.7365	.7270	5.1313	5.0592	4.9881
39	1.1970	1.1863	1.1755	5.3029	5.4299	5.3575
38	1.8243	1.8132	1.8020	6.0014	5.9278	5.8553
37	2.7965	2.7877	2.7787	6.7463	6.6743	6.6036
36	4.7031	4.7076	4.7121	8.1535	8.0914	8.0306

$\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
90	1.7788	1.7439	1.7098	2.4311	2.4049	2.3789
89	1.7960	1.7611	1.7269	2.4625	2.4356	2.4091
88	1.8136	1.7787	1.7444	2.4945	2.4670	2.4398
87	1.8315	1.7965	1.7623	2.5271	2.4990	2.4712
86	1.8498	1.8148	1.7805	2.5605	2.5317	2.5033
85	1.8684	1.8335	1.7992	2.5946	2.5651	2.5361
84	1.8875	1.8525	1.8182	2.6295	2.5994	2.5698
83	1.9070	1.8721	1.8377	2.6652	2.6345	2.6042
82	1.9270	1.8920	1.8577	2.7019	2.6705	2.6395
81	1.9475	1.9125	1.8781	2.7395	2.7074	2.6758
80	1.9684	1.9334	1.8991	2.7782	2.7454	2.7131
79	1.9899	1.9549	1.9206	2.8180	2.7845	2.7515
78	2.0120	1.9770	1.9427	2.8589	2.8247	2.7910
77	2.0346	1.9997	1.9654	2.9011	2.8662	2.8318
76	2.0579	2.0230	1.9887	2.9447	2.9091	2.8739
75	2.0819	2.0470	2.0127	2.9897	2.9533	2.9174
74	2.1066	2.0718	2.0375	3.0363	2.9992	2.9625
73	2.1320	2.0973	2.0631	3.0846	3.0467	3.0092
72	2.1583	2.1236	2.0895	3.1347	3.0959	3.0577
71	2.1854	2.1508	2.1168	3.1868	3.1472	3.1081
70	2.2135	2.1790	2.1450	3.2410	3.2005	3.1606
69	2.2426	2.2082	2.1743	3.2975	3.2561	3.2154
68	2.2728	2.2385	2.2048	3.3565	3.3142	3.2726
67	2.3042	2.2700	2.2364	3.4182	3.3750	3.3325
66	2.3369	2.3029	2.2694	3.4829	3.4388	3.3953
65	2.3709	2.3371	2.3037	3.5509	3.5058	3.4614
64	2.4065	2.3729	2.3397	3.6225	3.5764	3.5309
63	2.4437	2.4103	2.3774	3.6980	3.6509	3.6044
62	2.4827	2.4496	2.4169	3.7780	3.7298	3.6822
61	2.5238	2.4910	2.4586	3.8629	3.8135	3.7649
60	2.5671	2.5346	2.5025	3.9532	3.9027	3.8529
59	2.6129	2.5808	2.5491	4.0497	3.9980	3.9470
58	2.6615	2.6298	2.5985	4.1531	4.1001	4.0479
57	2.7132	2.6821	2.6512	4.2644	4.2101	4.1566
56	2.7686	2.7380	2.7077	4.3847	4.3291	4.2743
55	2.8280	2.7980	2.7684	4.5155	4.4584	4.4022
54	2.8921	2.8629	2.8340	4.6583	4.5998	4.5421
53	2.9618	2.9335	2.9054	4.8154	4.7553	4.6961
52	3.0380	3.0107	2.9836	4.9894	4.9277	4.8669
51	3.1220	3.0958	3.0699	5.1838	5.1204	5.0579
50	3.2154	3.1907	3.1662	5.4031	5.3380	5.2737
49	3.3206	3.2977	3.2748	5.6536	5.5866	5.5206
48	3.4408	3.4199	3.3991	5.9438	5.8750	5.8070
47	3.5803	3.5621	3.5439	6.2862	6.2155	6.1456
46	3.7462	3.7313	3.7165	6.6998	6.6272	6.5555
45	3.9495	3.9391	3.9287	7.2151	7.1408	7.0674
44	4.2097	4.2055	4.2013	7.8858	7.8103	7.7357
43	4.5653	4.5705	4.5756	8.8191	8.7436	8.6691
42	5.1097	5.1310	5.1522	10.2745	10.2029	10.1323
41	6.1774	6.2352	6.2935	13.1846	13.1329	13.0823

$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
90	− 1.5810	− 1.5689	− 1.5560	1.4890	1.4684	1.4483
89	− 1.5815	− 1.5687	− 1.5557	1.5203	1.4992	1.4784
88	− 1.5807	− 1.5678	− 1.5549	1.5523	1.5305	1.5091
87	− 1.5793	− 1.5665	− 1.5535	1.5849	1.5625	1.5405
86	− 1.5772	− 1.5645	− 1.5515	1.6183	1.5951	1.5725
85	− 1.5746	− 1.5618	− 1.5490	1.6522	1.6285	1.6053
84	− 1.5712	− 1.5585	− 1.5458	1.6869	1.6625	1.6387
83	− 1.5672	− 1.5546	− 1.5419	1.7224	1.6975	1.6729
82	− 1.5624	− 1.5499	− 1.5372	1.7568	1.7332	1.7080
81	− 1.5568	− 1.5444	− 1.5319	1.7960	1.7697	1.7439
80	− 1.5504	− 1.5381	− 1.5257	1.8341	1.8072	1.7807
79	− 1.5432	− 1.5310	− 1.5187	1.8733	1.8456	1.8184
78	− 1.5350	− 1.5230	− 1.5108	1.9134	1.8850	1.8571
77	− 1.5259	− 1.5140	− 1.5030	1.9546	1.9255	1.8969
76	− 1.5157	− 1.5040	− 1.4922	1.9970	1.9672	1.9379
75	− 1.5044	− 1.4939	− 1.4813	2.0406	2.0100	1.9800
74	− 1.4920	− 1.4807	− 1.4692	2.0855	2.0542	2.0234
73	− 1.4782	− 1.4672	− 1.4560	2.1318	2.0997	2.0682
72	− 1.4632	− 1.4524	− 1.4414	2.1795	2.1467	2.1145
71	− 1.4467	− 1.4361	− 1.4254	2.2289	2.1953	2.1623
70	− 1.4286	− 1.4183	− 1.4078	2.2800	2.2456	2.2118
69	− 1.4088	− 1.3988	− 1.3887	2.3329	2.2977	2.2630
68	− 1.3871	− 1.3775	− 1.3677	2.3878	2.3517	2.3163
67	− 1.3635	− 1.3542	− 1.3448	2.4448	2.4079	2.3716
66	− 1.3377	− 1.3288	− 1.3197	2.5042	2.4664	2.4292
65	− 1.3095	− 1.3010	− 1.2923	2.5660	2.5273	2.4893
64	− 1.2787	− 1.2706	− 1.2624	2.6306	2.5910	2.5521
63	− 1.2450	− 1.2374	− 1.2296	2.6983	2.6577	2.6179
62	− 1.2081	− 1.2010	− 1.1936	2.7692	2.7277	2.6869
61	− 1.1676	− 1.1610	− 1.1542	2.8438	2.8013	2.7595
60	− 1.1231	− 1.1171	− 1.1108	2.9224	2.8789	2.8361
59	− 1.0741	− 1.0687	− 1.0631	3.0055	2.9610	2.9172
58	− 1.0201	− 1.0153	− 1.0103	3.0936	3.0481	3.0032
57	− .9602	− .9562	− .9519	3.1875	3.1408	3.0949
56	− .8938	− .8905	− .8870	3.2878	3.2400	3.1930
55	− .8198	− .8173	− .8145	3.3956	3.3466	3.2984
54	− .7368	− .7352	− .7333	3.5119	3.4617	3.4123
53	− .6433	− .6426	− .6416	3.6381	3.5867	3.5361
52	− .5374	− .5377	− .5377	3.7761	3.7235	3.6716
51	− .4164	− .4177	− .4187	3.9282	3.8742	3.8210
50	− .2768	− .2793	− .2814	4.0975	4.0421	3.9876
49	− .1141	− .1178	− .1211	4.2879	4.2311	4.1752
48	.0782	.0734	.0688	4.5052	4.4470	4.3897
47	.3096	.3035	.2976	4.7576	4.6980	4.6393
46	.5944	.5869	.5798	5.0575	4.9966	4.9365
45	.9557	.9470	.9387	5.4249	5.3627	5.3015
44	1.4343	1.4248	1.4156	5.8948	5.8318	5.7697
43	2.1116	2.1021	2.0930	6.5369	6.4739	6.4118
42	3.1854	3.1788	3.1725	7.5193	7.4590	7.3995
41	5.3675	5.3756	5.3844	9.4448	9.3976	9.3513

$\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
90	1.9860	1.9526	1.9197	2.1949	2.1741	2.1536
89	2.0112	1.9777	1.9447	2.2300	2.2086	2.1875
88	2.0370	2.0034	1.9704	2.2660	2.2440	2.2223
87	2.0635	2.0298	1.9967	2.3030	2.2804	2.2581
86	2.0907	2.0570	2.0238	2.3410	2.3178	2.2949
85	2.1187	2.0849	2.0517	2.3802	2.3563	2.3328
84	2.1475	2.1137	2.0803	2.4205	2.3960	2.3719
83	2.1772	2.1432	2.1099	2.4621	2.4370	2.4122
82	2.2077	2.1737	2.1403	2.5051	2.4793	2.4539
81	2.2392	2.2052	2.1717	2.5495	2.5230	2.4969
80	2.2717	2.2377	2.2042	2.5955	2.5683	2.5416
79	2.3054	2.2713	2.2377	2.6431	2.6153	2.5878
78	2.3401	2.3060	2.2724	2.6926	2.6641	2.6359
77	2.3762	2.3421	2.3084	2.7441	2.7147	2.6858
76	2.4135	2.3794	2.3458	2.7976	2.7676	2.7379
75	2.4523	2.4182	2.3846	2.8535	2.8226	2.7922
74	2.4927	2.4586	2.4250	2.9118	2.8802	2.8489
73	2.5347	2.5006	2.4670	2.9729	2.9404	2.9083
72	2.5785	2.5445	2.5109	3.0369	3.0036	2.9707
71	2.6243	2.5903	2.5568	3.1042	3.0700	3.0362
70	2.6722	2.6384	2.6049	3.1750	3.1399	3.1052
69	2.7225	2.6887	2.6554	3.2498	3.2137	3.1781
68	2.7753	2.7417	2.7085	3.3289	3.2919	3.2553
67	2.8310	2.7975	2.7645	3.4129	3.3748	3.3373
66	2.8898	2.8565	2.8237	3.5022	3.4631	3.4245
65	2.9521	2.9191	2.8864	3.5975	3.5573	3.5177
64	3.0183	2.9856	2.9532	3.6997	3.6584	3.6176
63	3.0889	3.0565	3.0244	3.8095	3.7670	3.7251
62	3.1644	3.1324	3.1007	3.9281	3.8844	3.8413
61	3.2457	3.2141	3.1829	4.0567	4.0117	3.9674
60	3.3334	3.3024	3.2717	4.1970	4.1507	4.1050
59	3.4287	3.3984	3.3683	4.3510	4.3032	4.2562
58	3.5329	3.5034	3.4741	4.5209	4.4718	4.4232
57	3.6476	3.6190	3.5906	4.7101	4.6594	4.6094
56	3.7750	3.7475	3.7203	4.9226	4.8703	4.8186
55	3.9178	3.8918	3.8659	5.1636	5.1096	5.0563
54	4.0800	4.0557	4.0316	5.4406	5.3849	5.3299
53	4.2670	4.2448	4.2228	5.7639	5.7063	5.6495
52	4.4865	4.4671	4.4478	6.1483	6.0890	6.0304
51	4.7504	4.7348	4.7191	6.6170	6.5559	6.4955
50	5.0784	5.0677	5.0571	7.2075	7.1448	7.0828
49	5.5050	5.5015	5.4980	7.9866	7.9228	7.8598
48	6.0998	6.1075	6.1153	9.0895	9.0261	8.9634
47	7.0351	7.0630	7.0910	10.8511	10.7923	10.7343
46	8.9476	9.0246	9.1021	14.5132	14.4777	14.4432

$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
90	- 1.3444	- 1.3350	- 1.3257	1.4355	1.4086	1.3930
89	- 1.3441	- 1.3347	- 1.3254	1.4606	1.4431	1.4259
88	- 1.3432	- 1.3338	- 1.3245	1.4966	1.4785	1.4607
87	- 1.3415	- 1.3322	- 1.3229	1.5335	1.5149	1.4965
86	- 1.3392	- 1.3299	- 1.3207	1.5715	1.5522	1.5332
85	- 1.3361	- 1.3268	- 1.3177	1.6105	1.5906	1.5710
84	- 1.3323	- 1.3230	- 1.3139	1.6507	1.6302	1.6099
83	- 1.3276	- 1.3184	- 1.3094	1.6920	1.6708	1.6500
82	- 1.3219	- 1.3129	- 1.3039	1.7346	1.7126	1.6913
81	- 1.3154	- 1.3064	- 1.2976	1.7785	1.7560	1.7339
80	- 1.3078	- 1.2989	- 1.2902	1.8239	1.8007	1.7779
79	- 1.2991	- 1.2904	- 1.2818	1.8708	1.8469	1.8233
78	- 1.2893	- 1.2807	- 1.2722	1.9193	1.8947	1.8704
77	- 1.2781	- 1.2697	- 1.2614	1.9695	1.9442	1.9192
76	- 1.2656	- 1.2574	- 1.2492	2.0216	1.9955	1.9698
75	- 1.2516	- 1.2436	- 1.2356	2.0756	2.0488	2.0224
74	- 1.2360	- 1.2282	- 1.2205	2.1319	2.1043	2.0771
73	- 1.2187	- 1.2111	- 1.2036	2.1904	2.1620	2.1340
72	- 1.1994	- 1.1921	- 1.1848	2.2515	2.2223	2.1935
71	- 1.1780	- 1.1710	- 1.1640	2.3153	2.2852	2.2556
70	- 1.1544	- 1.1477	- 1.1410	2.3821	2.3512	2.3207
69	- 1.1282	- 1.1218	- 1.1155	2.4521	2.4203	2.3890
68	- 1.0992	- 1.0931	- 1.0872	2.5257	2.4930	2.4608
67	- 1.0671	- 1.0614	- 1.0558	2.6032	2.5696	2.5365
66	- 1.0315	- 1.0262	- 1.0210	2.6851	2.6506	2.6165
65	- .9919	- .9871	- .9823	2.7719	2.7364	2.7013
64	- .9479	- .9436	- .9393	2.8641	2.8275	2.7915
63	- .8989	- .8951	- .8913	2.9623	2.9247	2.8876
62	- .8442	- .8409	- .8377	3.0675	3.0289	2.9907
61	- .7828	- .7801	- .7775	3.1806	3.1408	3.1015
60	- .7137	- .7117	- .7097	3.3027	3.2617	3.2213
59	- .6355	- .6342	- .6330	3.4353	3.3931	3.3515
58	- .5467	- .5462	- .5457	3.5802	3.5368	3.4939
57	- .4450	- .4453	- .4456	3.7397	3.6951	3.6509
56	- .3277	- .3289	- .3301	3.9169	3.8708	3.8254
55	- .1911	- .1933	- .1954	4.1155	4.0681	4.0213
54	- .0302	- .0334	- .0365	4.3410	4.2922	4.2439
53	.1621	.1579	.1537	4.6008	4.5505	4.5008
52	.3962	.3909	.3856	4.9057	4.8540	4.8029
51	.6881	.6816	.6752	5.2724	5.2193	5.1663
50	1.0638	1.0564	1.0490	5.7279	5.6736	5.6198
49	1.5701	1.5619	1.5538	6.3201	6.2650	6.2104
48	2.3013	2.2934	2.2856	7.1457	7.0908	7.0365
47	3.4925	3.4877	3.4830	8.4435	8.3921	8.3412
46	6.0168	6.0282	6.0397	11.0965	11.0619	11.0281

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$\phi_c = 50°$

$\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
90	2.2310	2.1985	2.1665	2.0034	1.9867	1.9702
89	2.2675	2.2349	2.2028	2.0430	2.0257	2.0086
88	2.3053	2.2725	2.2403	2.0839	2.0661	2.0484
87	2.3443	2.3114	2.2790	2.1263	2.1078	2.0895
86	2.3847	2.3517	2.3192	2.1701	2.1511	2.1322
85	2.4266	2.3935	2.3608	2.2157	2.1960	2.1765
84	2.4701	2.4368	2.4040	2.2630	2.2426	2.2225
83	2.5152	2.4819	2.4489	2.3122	2.2912	2.2704
82	2.5622	2.5287	2.4957	2.3635	2.3418	2.3204
81	2.6111	2.5775	2.5443	2.4170	2.3947	2.3725
80	2.6620	2.6283	2.5951	2.4730	2.4499	2.4271
79	2.7152	2.6815	2.6481	2.5317	2.5078	2.4843
78	2.7709	2.7370	2.7036	2.5932	2.5686	2.5443
77	2.8292	2.7953	2.7618	2.6579	2.6325	2.6074
76	2.8904	2.8564	2.8228	2.7260	2.6999	2.6740
75	2.9547	2.9207	2.8871	2.7980	2.7710	2.7443
74	3.0225	2.9885	2.9548	2.8742	2.8463	2.8187
73	3.0941	3.0601	3.0264	2.9551	2.9263	2.8978
72	3.1699	3.1359	3.1023	3.0412	3.0115	2.9821
71	3.2504	3.2165	3.1829	3.1331	3.1024	3.0721
70	3.3361	3.3023	3.2688	3.2315	3.1999	3.1685
69	3.4277	3.3940	3.3606	3.3374	3.3047	3.2723
68	3.5259	3.4924	3.4592	3.4517	3.4178	3.3843
67	3.6317	3.5984	3.5654	3.5756	3.5406	3.5060
66	3.7460	3.7131	3.6804	3.7106	3.6744	3.6386
65	3.8704	3.8378	3.8055	3.8585	3.8210	3.7839
64	4.0064	3.9743	3.9425	4.0216	3.9828	3.9444
63	4.1561	4.1247	4.0934	4.2027	4.1624	4.1226
62	4.3223	4.2916	4.2611	4.4053	4.3636	4.3223
61	4.5082	4.4786	4.4491	4.6343	4.5910	4.5482
60	4.7187	4.6903	4.6621	4.8960	4.8510	4.8065
59	4.9600	4.9332	4.9066	5.1988	5.1522	5.1060
58	5.2409	5.2163	5.1918	5.5553	5.5068	5.4588
57	5.5747	5.5529	5.5312	5.9833	5.9330	5.8831
56	5.9815	5.9635	5.9456	6.5108	6.4587	6.4070
55	6.4946	6.4821	6.4696	7.1840	7.1303	7.0770
54	7.1741	7.1697	7.1654	8.0864	8.0315	7.9771
53	8.1431	8.1520	8.1610	9.3896	9.3351	9.2810
52	9.7131	9.7472	9.7814	11.5293	11.4797	11.4306
51	13.0785	13.1784	13.2791	16.1797	16.1566	16.1341

$\phi°$	ξ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
90	- 1.1509	- 1.1440	- 1.1372	1.3704	1.3564	1.3426
89	- 1.1505	- 1.1436	- 1.1369	1.4099	1.3954	1.3810
88	- 1.1494	- 1.1426	- 1.1358	1.4508	1.4357	1.4207
87	- 1.1476	- 1.1407	- 1.1340	1.4931	1.4774	1.4618
86	- 1.1449	- 1.1381	- 1.1314	1.5369	1.5206	1.5044
85	- 1.1413	- 1.1346	- 1.1280	1.5823	1.5654	1.5486
84	- 1.1368	- 1.1301	- 1.1235	1.6294	1.6118	1.5944
83	- 1.1312	- 1.1246	- 1.1181	1.6783	1.6601	1.6420
82	- 1.1245	- 1.1180	- 1.1116	1.7292	1.7103	1.6915
81	- 1.1166	- 1.1102	- 1.1039	1.7821	1.7625	1.7431
80	- 1.1074	- 1.1010	- 1.0949	1.8373	1.8170	1.7969
79	- 1.0967	- 1.0905	- 1.0844	1.8950	1.8739	1.8532
78	- 1.0844	- 1.0784	- 1.0725	1.9553	1.9335	1.9120
77	- 1.0704	- 1.0645	- 1.0588	2.0184	1.9959	1.9736
76	- 1.0545	- 1.0488	- 1.0433	2.0847	2.0614	2.0383
75	- 1.0365	- 1.0310	- 1.0257	2.1544	2.1302	2.1064
74	- 1.0161	- 1.0109	- 1.0058	2.2278	2.2028	2.1781
73	- .9931	- .9881	- .9833	2.3053	2.2795	2.2540
72	- .9672	- .9625	- .9579	2.3875	2.3607	2.3343
71	- .9381	- .9337	- .9294	2.4746	2.4469	2.4196
70	- .9052	- .9011	- .8972	2.5674	2.5388	2.5105
69	- .8681	- .8644	- .8608	2.6666	2.6370	2.6077
68	- .8262	- .8229	- .8197	2.7729	2.7423	2.7120
67	- .7788	- .7759	- .7732	2.8874	2.8557	2.8243
66	- .7249	- .7226	- .7203	3.0112	2.9784	2.9459
65	- .6635	- .6617	- .6600	3.1458	3.1118	3.0782
64	- .5933	- .5921	- .5909	3.2930	3.2578	3.2230
63	- .5125	- .5119	- .5113	3.4550	3.4185	3.3825
62	- .4189	- .4190	- .4191	3.6347	3.5970	3.5596
61	- .3096	- .3104	- .3113	3.8359	3.7968	3.7581
60	- .1807	- .1824	- .1840	4.0636	4.0230	3.9829
59	- .0269	- .0294	- .0320	4.3246	4.2825	4.2409
58	.1594	.1559	.1524	4.6284	4.5848	4.5417
57	.3894	.3850	.3805	4.9893	4.9443	4.8995
56	.6807	.6753	.6698	5.4291	5.3824	5.3362
55	1.0623	1.0559	1.0495	5.9838	5.9358	5.8882
54	1.5866	1.5796	1.5725	6.7182	6.6692	6.6208
53	2.3624	2.3556	2.3488	7.7653	7.7166	7.6684
52	3.6663	3.6626	3.6588	9.4617	9.4170	9.3727
51	6.5665	6.5792	6.5920	13.0970	13.0729	13.0494

$\phi_c = 55°$

$\phi°$	τ			σ		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0 02	f = 0.03
90	2.5275	2.4956	2.4642	1.8434	1.8299	1.8164
89	2.5806	2.5486	2.5169	1.8885	1.8743	1.8603
88	2.6360	2.6038	2.5719	1.9355	1.9208	1.9061
87	2.6939	2.6614	2.6293	1.9846	1.9693	1.9541
86	2.7545	2.7218	2.6895	2.0360	2.0201	2.0043
85	2.8179	2.7850	2.7524	2.0899	2.0733	2.0569
84	2.8844	2.8513	2.8185	2.1465	2.1293	2.1122
83	2.9543	2.9210	2.8880	2.2062	2.1882	2.1705
82	3.0279	2.9943	2.9612	2.2690	2.2504	2.2320
81	3.1054	3.0717	3.0383	2.3355	2.3162	2.2970
80	3.1874	3.1535	3.1199	2.4059	2.3858	2.3659
79	3.2742	3.2401	3.2064	2.4808	2.4599	2.4392
78	3.3664	3.3322	3.2983	2.5605	2.5388	2.5173
77	3.4645	3.4301	3.3961	2.6457	2.6231	2.6008
76	3.5693	3.5348	3.5006	2.7370	2.7135	2.6903
75	3.6815	3.6469	3.6126	2.8352	2.8108	2.7866
74	3.8021	3.7674	3.7331	2.9412	2.9158	2.8907
73	3.9322	3.8975	3.8631	3.0562	3.0298	3.0036
72	4.0732	4.0385	4.0042	3.1815	3.1540	3.1267
71	4.2268	4.1922	4.1579	3.3186	3.2900	3.2616
70	4.3949	4.3605	4.3263	3.4697	3.4399	3.4103
69	4.5801	4.5459	4.5120	3.6373	3.6061	3.5753
68	4.7857	4.7518	4.7182	3.8244	3.7919	3.7597
67	5.0156	4.9823	4.9492	4.0352	4.0013	3.9676
66	5.2754	5.2427	5.2103	4.2751	4.2396	4.2045
65	5.5721	5.5405	5.5091	4.5513	4.5142	4.4774
64	5.9159	5.8856	5.8555	4.8739	4.8350	4.7965
63	6.3206	6.2924	6.2642	5.2570	5.2163	5.1760
62	6.8080	6.7823	6.7566	5.7221	5.6795	5.6373
61	7.4104	7.3883	7.3664	6.3025	6.2579	6.2137
60	8.1829	8.1664	8.1500	7.0539	7.0075	6.9614
59	9.2261	9.2184	9.2107	8.0790	8.0312	7.9836
58	10.7506	10.7580	10.7654	9.5929	9.5449	9.4973
57	13.3031	13.3407	13.3784	12.1553	12.1120	12.0690
56	19.0640	19.1878	19.3125	18.0066	17.9912	17.9762

$\phi°$	ℓ			η		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
90	- .9880	- .9839	- .9778	1.3214	1.3098	1.2982
89	- .9876	- .9825	- .9774	1.3665	1.3542	1.3421
88	- .9864	- .9813	- .9762	1.4134	1.4006	1.3879
87	- .9842	- .9791	- .9741	1.4625	1.4491	1.4358
86	- .9811	- .9760	- .9710	1.5138	1.4998	1.4859
85	- .9768	- .9719	- .9669	1.5676	1.5529	1.5384
84	- .9714	- .9665	- .9616	1.6240	1.6086	1.5935
83	- .9647	- .9598	- .9550	1.6832	1.6672	1.6514
82	- .9564	- .9517	- .9469	1.7455	1.7388	1.7123
81	- .9466	- .9430	- .9373	1.8113	1.7938	1.7766
80	- .9350	- .9305	- .9259	1.8807	1.8626	1.8446
79	- .9213	- .9170	- .9126	1.9543	1.9354	1.9167
78	- .9054	- .9012	- .8970	2.0324	2.0127	1.9932
77	- .8870	- .8830	- .8789	2.1156	2.0950	2.0746
76	- .8657	- .8619	- .8580	2.2044	2.1829	2.1617
75	- .8411	- .8375	- .8339	2.2994	2.2771	2.2550
74	- .8127	- .8094	- .8061	2.4016	2.3783	2.3553
73	- .7800	- .7770	- .7740	2.5118	2.4876	2.4635
72	- .7424	- .7397	- .7370	2.6313	2.6060	2.5809
71	- .6988	- .6965	- .6941	2.7614	2.7350	2.7089
70	- .6484	- .6464	- .6445	2.9038	2.8763	2.8490
69	- .5897	- .5882	- .5867	3.0607	3.0320	3.0035
68	- .5211	- .5201	- .5191	3.2348	3.2048	3.1751
67	- .4403	- .4399	- .4395	3.4296	3.3982	3.3672
66	- .3446	- .3448	- .3450	3.6495	3.6168	3.5843
65	- .2300	- .2309	- .2317	3.9009	3.8666	3.8327
64	- .0911	- .0928	- .0943	4.1920	4.1561	4.1206
63	.0800	.0775	.0751	4.5348	4.4973	4.4602
62	.2948	.2915	.2882	4.9473	4.9081	4.8693
61	.5719	.5676	.5634	5.4572	5.4163	5.3758
60	.9422	.9370	.9319	6.1111	6.0686	6.0264
59	1.4629	1.4570	1.4511	6.9941	6.9503	6.9069
58	2.2547	2.2487	2.2429	8.2843	8.2405	8.1970
57	3.6334	3.6299	3.6265	10.4442	10.4042	10.3646
56	6.8703	6.8822	6.8944	15.3186	15.3019	15.2856

$$\phi_c = 60°$$

$\phi°$	τ			σ		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
90	2.8983	2.8669	2.8357	1.7055	1.6945	1.6835
89	2.9768	2.9450	2.9135	1.7575	1.7459	1.7344
88	3.0596	3.0275	2.9957	1.8124	1.8002	1.7881
87	3.1472	3.1147	3.0826	1.8704	1.8577	1.8450
86	3.2401	3.2073	3.1748	1.9321	1.9186	1.9053
85	3.3387	3.3056	3.2727	1.9976	1.9835	1.9695
84	3.4438	3.4103	3.3771	2.0675	2.0527	2.0380
83	3.5559	3.5220	3.4885	2.1422	2.1267	2.1113
82	3.6759	3.6417	3.6079	2.2224	2.2061	2.1900
81	3.8048	3.7703	3.7361	2.3087	2.2916	2.2748
80	3.9437	3.9089	3.8744	2.4019	2.3841	2.3663
79	4.0939	4.0588	4.0240	2.5031	2.4843	2.4658
78	4.2570	4.2216	4.1865	2.6133	2.5936	2.5741
77	4.4350	4.3993	4.3639	2.7340	2.7134	2.6929
76	4.6302	4.5943	4.5587	2.8669	2.8452	2.8237
75	4.8454	4.8094	4.7736	3.0142	2.9913	2.9687
74	5.0845	5.0483	5.0124	3.1764	3.1544	3.1305
73	5.3519	5.3157	5.2797	3.3651	3.3377	3.3126
72	5.6537	5.6176	5.5817	3.5726	3.5459	3.5194
71	5.9978	5.9620	5.9264	3.8128	3.7847	3.7567
70	6.3950	6.3597	6.3245	4.0918	4.0620	4.0325
69	6.8601	6.8256	6.7912	4.4205	4.3890	4.3578
68	7.4147	7.3815	7.3484	4.8151	4.7817	4.7486
67	8.0909	8.0596	8.0285	5.2996	5.2642	5.2290
66	8.9396	8.9115	8.8835	5.9123	5.8747	5.8374
65	10.0472	10.0241	10.0011	6.7180	6.6782	6.6388
64	11.5743	11.5452	11.5452	7.8380	7.7963	7.7549
63	13.8644	13.8655	13.8665	9.5319	9.4892	9.4468
62	17.8337	17.8686	17.9035	12.4944	12.4549	12.4156
61	27.2979	27.4392	27.5811	19.6261	19.6128	19.5998

$$\phi_c = 65°$$

$\phi°$	τ			σ		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
90	3.3851	3.3537	3.3226	1.5830	1.5740	1.5651
89	3.5046	3.4727	3.4411	1.6442	1.6346	1.6252
88	3.6328	3.6004	3.5683	1.7098	1.6997	1.6897
87	3.7709	3.7380	3.7054	1.7806	1.7699	1.7592
86	3.9200	3.8866	3.8535	1.8571	1.8457	1.8343
85	.0817	4.0477	4.0140	1.9401	1.9280	1.9159
84	.2576	4.2231	4.1888	2.0305	2.0177	2.0049
83	.4499	4.4148	4.3800	2.1296	2.1160	2.1024
82	4.6610	4.6254	4.5901	2.2386	2.2242	2.2098
81	4.8943	4.8581	4.8222	2.3593	2.3439	2.3286

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$\phi°$	ξ			η		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
90	– .8463	– .8425	– .8388	1.2769	1.2672	1.2575
89	– .8459	– .8420	– .8384	1.3289	1.3186	1.3083
88	– .8445	– .8406	– .8370	1.3837	1.3728	1.3620
87	– .8419	– .8381	– .8345	1.4417	1.4302	1.4188
86	– .8381	– .8344	– .8308	1.5033	1.4911	1.4791
85	– .8330	– .8293	– .8257	1.5686	1.5558	1.5431
84	– .8263	– .8226	– .8192	1.6381	1.6246	1.6113
83	– .8178	– .8143	– .8109	1.7124	1.6982	1.6841
82	– .8074	– .8039	– .8006	1.7919	1.7769	1.7621
81	– .7946	– .7912	– .7880	1.8772	1.8615	1.8459
80	– .7792	– .7760	– .7729	1.9692	1.9526	1.9363
79	– .7607	– .7577	– .7548	2.0687	2.0512	2.0340
78	– .7387	– .7359	– .7332	2.1767	2.1583	2.1402
77	– .7126	– .7099	– .7075	2.2945	2.2752	2.2561
76	– .6816	– .6791	– .6769	2.4238	2.4034	2.3833
75	– .6447	– .6425	– .6406	2.5663	2.5449	2.5237
74	– .6008	– .5989	– .5973	2.7245	2.7020	2.6796
73	– .5483	– .5468	– .5455	2.9016	2.8778	2.8542
72	– .4852	– .4842	– .4833	3.1014	3.0763	3.0514
71	– .4090	– .4084	– .4080	3.3292	3.3027	3.2764
70	– .3158	– .3158	– .3159	3.5921	3.5641	3.5364
69	– .2006	– .2012	– .2019	3.9000	3.8704	3.8410
68	– .0559	– .0571	– .0585	4.2671	4.2357	4.2046
67	.1297	.1276	.1255	4.7147	4.6814	4.6484
66	.3742	.3713	.3683	5.2764	5.2412	5.2062
65	.7086	.7048	.7009	6.0094	5.9722	5.9353
64	1.1913	1.1867	1.1819	7.0201	6.9811	6.9424
63	1.9481	1.9431	1.9379	8.5355	8.4956	8.4560
62	3.3185	3.3149	3.3112	11.1619	11.1249	11.0880
61	6.7314	6.7404	6.7493	17.4239	17.4098	17.3961

$\phi_c = 65°$

ϕ	ξ			η		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
90	– .7187	– .7159	– .7132	1.2353	1.2272	1.2192
89	– .7182	– .7153	– .7126	1.2965	1.2878	1.2792
88	– .7165	– .7136	– .7109	1.3621	1.3529	1.3437
87	– .7134	– .7106	– .7079	1.4328	1.4229	1.4131
86	– .7087	– .7059	– .7033	1.5092	1.4986	1.4882
85	– .7022	– .6995	– .6969	1.5919	1.5806	1.5695
84	– .6935	– .6909	– .6883	1.6819	1.6699	1.6581
83	– .6823	– .6797	– 6773	1.7804	1.7676	1.7549
82	– .6680	– .6656	– .6633	1.8885	1.8748	1.8614
81	– .6502	– .6479	– .6457	2.0078	1.9933	1.9789

$\phi_c = 65°$ (continued)

$\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
80	5.1534	5.1167	5.0802	2.4938	2.4775	2.4612
79	5.4435	5.4062	5.3692	2.6448	2.6274	2.6101
78	5.7706	5.7329	5.6954	2.8157	2.7972	2.7787
77	6.1431	6.1049	6.0670	3.0110	2.9912	2.9715
76	6.5719	6.5333	6.4950	3.2367	3.2155	3.1945
75	7.0717	7.0330	6.9945	3.5009	3.4783	3.4557
74	7.6636	7.6249	7.5864	3.8153	3.7910	3.7668
73	8.3780	8.3396	8.3014	4.1966	4.1705	4.1444
72	9.2607	9.2233	9.1860	4.6704	4.6422	4.6141
71	10.3858	10.3502	10.3147	5.2776	5.2471	5.2168
70	11.8802	11.8481	11.8161	6.0889	6.0560	6.0233
69	13.9844	13.9590	13.9338	7.2387	7.2032	7.1679
68	17.2234	17.2119	17.2005	9.0205	8.9829	8.9454
67	23.0388	23.0605	23.0824	12.2425	12.2055	12.1686
66	37.7031	37.8426	37.9827	20.4301	20.4129	20.3960

$\phi_c = 70°$

$\phi°$	τ			σ		
	$f = 0.01$	$f = 0.02$	$f = 0.03$	$f = 0.01$	$f = 0.02$	$f = 0.03$
90	4.0708	4.0392	4.0078	1.4703	1.4632	1.4561
89	4.2637	4.2313	4.1992	1.5447	1.5370	1.5293
88	4.4757	4.4426	4.4097	1.6266	1.6183	1.6100
87	4.7101	4.6762	4.6425	1.7171	1.7081	1.6992
86	4.9706	4.9360	4.9014	1.8179	1.8032	1.7985
85	5.2624	5.2267	5.1913	1.9307	1.9202	1.9098
84	5.5911	5.5545	5.5181	2.0582	2.0468	2.0355
83	5.9648	5.9273	5.8899	2.2033	2.1910	2.1788
82	6.3939	6.3554	6.3170	2.3703	2.3570	2.3437
81	6.8922	6.8526	6.8133	2.5647	2.5502	2.5359
80	7.4787	7.4382	7.3979	2.7941	2.7784	2.7628
79	8.1806	8.1391	8.0979	3.0695	3.0524	3.0353
78	9.0374	8.9952	8.9531	3.4069	3.3891	3.3694
77	10.1101	10.0672	10.0246	3.8308	3.8101	3.7895
76	11.4972	11.4543	11.4116	4.3812	4.3583	4.3355
75	13.3708	13.3290	13.2873	5.1279	5.1024	5.0772
74	16.0627	16.0242	15.9858	6.2058	6.1773	6.1491
73	20.3117	20.2822	20.2527	7.9157	7.8840	7.8525
72	28.2033	28.1996	28.1960	11.1088	11.0747	11.0408
71	49.2094	49.3146	49.4201	19.6587	19.6340	19.6097

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Table 4

$\phi_c = 65°$ (continued)

$\phi°$	ξ			η		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
80	− .6279	− .6258	− .6238	2.1405	2.1250	2.1097
79	− .6004	− .5985	− .5966	2.2889	2.2724	2.2560
78	− .5663	− .5645	− .5630	2.4554	2.4387	2.4213
77	− .5240	− .5236	− .5212	2.6470	2.6282	2.6095
76	− .4712	− .4701	− .4691	2.8665	2.8463	2.8263
75	− .4050	− .4043	− .4036	3.1223	3.1007	3.0792
74	− .3209	− .3206	− .3204	3.4252	3.4020	3.3790
73	− .2125	− .2128	− .2130	3.7908	3.7658	3.7410
72	− .0699	− .0708	− .0717	4.2425	4.2156	4.1889
71	.1230	.1214	.1198	4.8183	4.7892	4.7603
70	.3942	.3918	.3893	5.5830	5.5516	5.5204
69	.7974	.7941	.7908	6.6597	6.6259	6.5923
68	1.4516	1.4475	1.4434	8.3171	8.2812	8.2456
67	2.6876	2.6837	2.6798	11.2926	11.2572	11.2222
66	5.9649	5.9691	5.9733	18.7954	18.7784	18.7616

$\phi_c = 70°$

$\phi°$	ξ			η		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
90	− .5993	− .5974	− .5955	1.1951	1.1885	1.1819
89	− .5987	− .5968	− .5948	1.2695	1.2623	1.2552
88	− .5965	− .5946	− .5927	1.3513	1.3436	1.3358
87	− .5926	− .5907	− .5888	1.4418	1.4334	1.4249
86	− .5864	− .5846	− .5827	1.5423	1.5332	1.5241
85	− .5775	− .5758	− .5740	1.6549	1.6449	1.6350
84	− .5653	− .5636	− .5619	1.7817	1.7709	1.7602
83	− .5488	− .5473	− .5457	1.9259	1.9142	1.9025
82	− .5270	− .5256	− .5241	2.0914	2.0787	2.0660
81	− .4982	− .4970	− .4957	2.2837	2.2698	2.2560
80	− .4603	− .4592	− .4582	2.5100	2.4949	2.4798
79	− .4100	− .4092	− .4084	2.7808	2.7643	2.7478
78	− .3427	− .3422	− .3417	3.1113	3.0932	3.0751
77	− .2508	− .2507	− .2506	3.5251	3.5052	3.4852
76	− .1221	− .1225	− .1230	4.0603	4.0382	4.0161
75	.0652	.0641	.0631	4.7831	4.7585	4.7340
74	.3539	.3520	.3502	5.8216	5.7941	5.7668
73	.8408	.8379	.8352	7.4607	7.4301	7.3997
72	1.8041	1.8006	1.7971	10.5050	10.4721	10.4394
71	4.5313	4.5308	4.5304	18.6081	18.5842	18.5605

ϕ°	τ			σ		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
90	5.1490	5.1168	5.0847	1.3626	1.3571	1.3516
89	5.4957	5.4623	5.4291	1.4585	1.4524	1.4463
68	5.8926	5.8579	5.8234	1.5683	1.5616	1.5548
87	6.3515	6.3154	6.2795	1.6954	1.6879	1.6804
86	6.8886	6.8510	6.8136	1.8443	1.8359	1.8276
85	.5263	7.4870	7.4479	2.0212	2.0119	2.0027
84	8.2963	8.2552	8.2144	2.2353	2.2249	2.2145
83	9.2458	9.2029	9.1601	2.4996	2.4880	2.4764
82	10.4481	10.4031	10.3583	2.8351	2.8219	2.8089
81	12.0229	11.9758	11.9289	3.2755	3.2606	3.2457
80	14.1820	14.1331	14.0842	3.8812	3.8640	3.8470
79	17.3398	17.2897	17.2396	4.7696	4.7497	4.7298
78	22.4365	22.3879	22.3394	6.2086	6.1851	6.1616
77	32.1924	32.1556	32.1188	8.9735	8.9454	8.9175
76	59.4488	59.4845	59.5202	16.7307	16.7012	16.6718

ϕ°	τ			σ		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
90	7.1984	7.1647	7.1312	1.2545	1.2506	1.2467
89	7.9774	7.9415	7.9058	1.3938	1.3892	1.3846
88	8.9456	8.9073	8.8690	1.5669	1.5615	1.5562
87	10.1824	10.1411	10.0999	1.7882	1.7819	1.7756
86	11.8186	11.7739	11.7292	2.0812	2.0737	2.0664
85	14.0887	14.0397	13.9908	2.4882	2.4792	2.4704
84	17.4553	17.4012	17.3473	3.0927	3.0817	3.0710
83	22.9856	22.9257	22.8660	4.0876	4.0738	4.0602
82	33.8271	33.7625	33.6981	6.0423	6.0241	6.0062
81	65.3053	65.2582	65.2111	11.7323	11.7071	11.6820

ϕ°	τ			σ		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
90	13.0992	13.0619	13.0246	1.1391	1.1367	1.1344
89	16.3515	16.3082	16.2648	1.4245	1.4213	1.4182
88	21.7543	21.7021	21.6497	1.8987	1.8944	1.8901
87	32.5086	32.4421	32.3752	2.8433	2.8369	2.8305
86	64.5147	64.4214	64.3274	5.6573	5.6461	5.6349

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Table 4

$\phi_c = 75°$

$\phi°$	ξ			η		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
90	− .4823	− .4811	− .4799	1.1547	1.1495	1.1444
89	− .4814	− .4802	− .4791	1.2506	1.2448	1.2391
88	− .4785	− .4774	− .4762	1.3604	1.3540	1.3476
87	− .4730	− .4718	− .4707	1.4874	1.4802	1.4731
86	− .4638	− .4627	− .4617	1.6360	1.6279	1.6200
85	− .4499	− .4489	− .4479	1.8124	1.8034	1.7945
84	− .4293	− .4284	− .4275	2.0254	2.0153	2.0083
83	− .3993	− .3986	− .3978	2.2880	2.2767	2.2655
82	− .3554	− .3548	− .3543	2.6206	2.6078	2.5951
81	− .2902	− .2898	− .2896	3.0562	3.0416	3.0271
80	− .1899	− .1899	− .1900	3.6535	3.6367	3.6201
79	− .0274	− .0280	− .0286	4.5270	4.5075	4.4880
78	.2606	.2593	.2579	5.9369	5.9138	5.8908
77	.8619	.8597	.8574	8.6355	8.6080	8.5807
76	2.6867	2.6841	2.6815	16.1749	16.1461	16.1173

$\phi_c = 80°$

$\phi°$	ξ			η		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
90	− .3606	− .3599	− .3592	1.1120	1.1082	1.1045
89	− .3593	− .3586	− .3579	1.2513	1.2468	1.2424
88	− .3547	− .3541	− .3534	1.4243	1.4191	1.4140
87	− .3450	− .3444	− .3437	1.6454	1.6392	1.6331
86	− .3270	− .3264	− .3258	1.9378	1.9305	1.9233
85	− .2948	− .2944	− .2939	2.3435	2.3348	2.3261
84	− .2365	− .2363	− .2360	2.9452	2.9345	2.9238
83	− .1231	− .1233	− .1233	3.9336	3.9201	3.9066
82	.1342	.1336	.1330	5.8713	5.8534	5.8356
81	.9859	.9842	.9826	11.4972	11.4723	11.4475

$\phi_c = 85°$

$\phi°$	ξ			η		
	f = 0.01	f = 0.02	f = 0.03	f = 0.01	f = 0.02	f = 0.03
90	− .2212	− .2209	− .2206	1.0636	1.0613	1.0590
89	− .2186	− .2182	− .2179	1.3489	1.3459	1.3428
88	− .2057	− .2055	− .2052	1.8230	1.8188	1.8145
87	− .1635	− .1633	− .1631	2.7666	2.7603	2.7540
86	.0138	.0136	.0135	5.5750	5.5639	5.5527